Exhibit 3

BEFORE THE
UNITED STATES COURT
SOUTHERN DISTRICT OF NEW YORK

UNITED STATES OF AMERICA; the States of CALIFORNIA, COLORADO, CONNECTICUT, DELAWARE, FLORIDA, GEORGIA, HAWAII, ILLINOIS, INDIANA, IOWA, LOUISIANA, MARYLAND, MASSACHUSETTS, MICHIGAN, MINNESOTA, MONTANA, NEVADA, NEW HAMPSHIRE, NEW JERSEY, NEW MEXICO, NEW YORK, NORTH CAROLINA, OKLAHOMA, RHODE ISLAND, TENNESSEE, TEXAS, VIRGINA, WASHINGTON, WISCONSIN; the DISTRICT OF COLUMBIA; the CITY OF CHICAGO, and the CITY OF NEW YORK, *ex rel.* OSWALD BILOTTA,	)	
Plaintiffs and Relator,	)	
v.	)	
NOVARTIS PHARMACEUTICALS CORPORATION,	)	**Case No., 11 Civ. 0071 (PGG)**
Defendant.	)	
----------	)	
UNITED STATES OF AMERICA,	)	
Plaintiff,	)	
v.	)	
NOVARTIS PHARMACEUTICALS CORP.,	)	
Defendant.	)	

EXPERT REPORT OF PROFESSOR DANIEL MCFADDEN ON BEHALF OF PLAINTIFFS

August 14, 2017

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I. Qualifications

A. Biography

1. I am the E. Morris Cox Professor Emeritus of Economics at the University of California at Berkeley and also the Presidential Professor of Health Economics at the University of Southern California. My office is located in Evans Hall at 508-1 Evans Hall #3880, Berkeley, CA. Previously, I was the James R. Killian Professor of Economics at MIT. I received my Ph.D. in Economics from the University of Minnesota in 1962. I am also a principal of the Brattle Group ("Brattle"), an economics and financial consulting firm.

2. I have received numerous fellowships and honors over my career. In 2000, I was awarded the Nobel Memorial Prize in Economics for showing "how to statistically handle fundamental aspects of microdata, namely data on the most important decisions we make in life: the choice of education, occupation, place of residence, marital status, number of children, so called discrete choices."[1] In 1975, I was awarded the John Bates Clark Medal by the American Economic Association, given to the economist under 40 who has made the most significant contribution to economics.

3. Over the course of my career, I have published more than one hundred peer-reviewed articles and have written or edited several academic books and monographs on economic modeling. I have served as the Chair of the National Academy of Science section on Economic Sciences and am on the Advisory Committee for the *Journal of Applied Econometrics*. I have previously served as an editor of several other peer-reviewed academic journals and am past-president of the American Economic Association and of the Econometric Society.

4. My curriculum vitae, which provides a more detailed summary of my qualifications, including a list of my publications and a list of my previous expert testimony within the last four years, is attached as Appendix A.

[1] "Daniel L. McFadden – Facts," Nobelprize.org, accessed 2/17/2017, http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2000/mcfadden-facts.html.

B. Compensation

5. Brattle charges $1000 per hour for my services. Several Brattle colleagues have helped me in preparing the analyses I used to establish my conclusions in this matter. Brattle charges between $185 and $550 per hour for these staff members. Our compensation is not contingent on my findings or on the result of this proceeding.

C. Facts or Data Considered

6. For a comprehensive list of the facts and data I considered in forming my opinions, please refer to Appendix B.

D. Right to Revise

7. I reserve the right to revise my analysis and conclusions should additional information become available prior to trial.

II. Assignment

8. I have been asked by the U.S. Attorney's Office for the Southern District of New York ("SDNY") to address whether and to what extent Novartis prescription rates among doctors have been influenced by receiving kickbacks, in violation of the Anti-Kickback Statute (42 U.S.C Section 1320a-7b(b)), through Novartis events involving ten drugs: Diovan, Diovan HCT, Exforge, Exforge HCT, Lotrel, Starlix, Tekamlo, Tekturna, Tekturna HCT, and Valturna.[2] I have also been asked to calculate damages to the United States and state governments for costs incurred by four health care programs (Medicare Part D, Medicaid, TRICARE, and the Veterans Administration Health Care).[3]

9. Counsel has advised me that, based on the opinions of another expert, they are using the criteria referenced below to identify kickbacks. The qualifying events identified in these criteria for each of the drugs at issue are classified by Novartis as Roundtables or Speaker

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[2] Amended Complaint, *United States of America vs. Novartis Pharmaceuticals Corp.*, No. 11-cv-0071-PGG ¶ 13, August 26, 2013.

[3] I exclude the Veterans Administration Health Care ("VA") because of the relatively modest number of prescriptions of the drugs at issue and difficulties matching doctors from Novartis's events database to the VA prescription data.

Programs (including PILS).[4] I have not undertaken any independent investigation of the educational content of Novartis events, and I am not offering an opinion on the appropriateness of these criteria. A second expert, Richard Goldberg, then analyzed Novartis's events data and created a list of doctors who have met each criterion and a timeline of events showing when, based on each criterion, Novartis provided kickbacks to each doctor. That list of doctors, and accompanying timelines of kickbacks for each doctor, was provided to me for my analysis.

10. These criteria are as follows: a doctor is deemed to have received a kickback reward from Novartis in a given month if, between January 1, 2002 and November 30, 2011 (or the "study period"), the doctor met at least one of the following criteria:[5]

    1) ***Repeat Attendance***: any event attended by a doctor after he or she attended two or more events for the same specified drug when considering Speaker Programs (including PILS) and Roundtables in the prior 182 days.

    2) ***Speaker then Attendee***: any Speaker Program (including PILS) attended by a doctor after the doctor had previously been a speaker at a Speaker Program for the same specified drug in the prior 182 days.

    3) ***Excessive Meal Spend***: any Speaker Program (including PILS) or Roundtable at which a doctor participated with a per person spending on meals of $125 or more if the doctor had participated in at least two other such events, for any of the drugs at issue, with a per capita spend of $125 or more in the prior 364 days.

11. Based on data provided to me by Dr. Goldberg, the number of doctors who participated in at least one qualifying event for the ten drugs at issue from 2003[6]-2011 and who may,

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[4] PILS refers to a "Physician Integrated Learning Program" where in addition to physicians being speakers, other physicians acted as "Patient Type Presenter," (PTP). See Expert Report of Richard Goldberg, *United States v Novartis Pharmaceutical Corp.*, No. 11-cv-0071-PGG, at 20:10-23:8, August 14, 2017, ("Goldberg Report"). See Goldberg Report 20:10-23:8 for additional information on the applications of these criteria.

[5] Expert Report of Richard Goldberg, *United States v Novartis Pharmaceutical Corp.*, No. 11-cv-0071-PGG, Goldberg Report at 19:3-20:9, August 14, 2017, ("Goldberg Report").

[6] For reasons explains in his report, Dr. Goldberg did not have suitable data to work with for 2002 and much of 2003 (Goldberg Report 7:15 -9:7).

therefore, have been provided kickbacks is 170,707.[7] My analysis is limited to doctors who participated in Novartis events and for whom Novartis-constructed doctor identifiers are available. In addition, for purposes of my modeling, my study sample includes doctors who prescribed the drugs at issue between 2004 and 2011 regardless of whether they participated in any Novartis-sponsored events for the ten drugs at issue.

III. Summary of Conclusions

12. In brief, I find that:

1) The kickbacks identified by the criteria caused doctors to write more prescriptions for Novartis drugs at issue than they otherwise would have.

2) Between 2004 and 2011, and based on the data currently available to me, doctors who met one or more of the kickback criteria wrote 7.5 million prescriptions for which claims were submitted to and reimbursed by Medicare Part D, Medicaid, and TRICARE for Novartis's Covered Drugs[8] while influenced by receipt of a kickback from Novartis. Based on the government's costs provided to me for payments made by Medicare Part D, Medicaid, and TRICARE, the United States paid $411 million in total and certain state governments paid $25.5 million in total for these prescriptions.[9,10]

3) These costs could be conservative for several reasons that are described in detail in the body of my report. These reasons include incomplete data to identify kickbacks prior to 2004 and potential undercounting of kickbacks between 2004 and 2011. The costs reported above also don't include penalties (which I understand to be available under the relevant law and am prepared to calculate),

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[7] Goldberg Report 23:11.

[8] Counsel defines "Covered Drugs" to include these ten drugs on or after January 1, 2010, and Diovan HCT, Exforge HCT, Lotrel, Starlix, Tekamlo, Tekturna HCT, and Valturna before that date.

[9] These states are California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Oklahoma, Rhode Island, Tennessee, Texas, Virginia, Washington, and Wisconsin as well as the District of Columbia. (Third Amended False Claims Act Complaint, No. 11-cv-00071-PGG, July 10, 2013).

[10] Because of incomplete data and/or data documentation, I am unable to apply my method of calculating damages as described in section VIII.C to a subset of states. If additional data and/or documentation from these states become available, I reserve the right to supplement my calculations.

and are not trebled (which I also understand to be appropriate under the relevant law and am prepared to calculate).

IV. Background

A. Review of Government Allegations

13. The United States alleges that, from January 2002 through November 2011, Novartis violated the Anti-Kickback Statute by systematically paying kickbacks to doctors[11] in connection with events on the Covered Drugs.[12] Certain payments and sponsored meals provided to doctors are considered by the United States as kickbacks to induce the recipients to write prescriptions for Novartis drugs. The Government is using specific criteria, described above in ¶10, to identify kickbacks.

14. The United States claims that, by paying kickbacks to doctors, Novartis caused the submission of false claims for payment of the ten drugs at issue to the Medicare Part D, Medicaid, TRICARE, and VA programs.[13] As a consequence, Novartis is liable under the False Claims Act for treble damages and statutory penalties for these claims.

B. Drugs at Issue

15. The Government has identified events for ten Novartis drugs where, based on application of the criteria to the available data, Novartis provided kickbacks to doctors between 2003 and 2011. The names of the drugs, their entry dates, and patent expiration dates are listed in Table 1. For eight of these drugs during the study period, generic equivalents did not become available. Generic equivalents were approved for Lotrel and Starlix in May 2007 and September 2009, respectively.

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[11] For purposes of my report, I use the term doctors as a shorthand for health care practitioners.

[12] Amended Complaint, *United States of America vs. Novartis Pharmaceuticals Corp.*, No. 11-cv-0071-PGG, ¶1-2, August 26, 2013.

[13] As explained above in footnote 3, I have excluded one of the government programs, the VA, from the damages calculation.

Table 1: Dates for FDA Approval, Generic Approval, and Generic Names

		FDA Approval	FDA Approval of Generic Equivalent	Generic name
		[A]	[B]	[C]
Lotrel	[1]	Mar-95	May-07	Amlodipine Besylate & benazepril
Diovan HCT	[2]	Mar-98	Sep-12	Valsartan & hydrochlorothiazide
Starlix	[3]	Dec-00	Sep-09	Nateglinide
Diovan	[4]	Jul-01	Jun-14	Valsartan
Tekturna	[5]	Mar-07	.	None available
Exforge	[6]	Jun-07	Mar-13	Amlodipine-besylate and valsartan
Tekturna HCT	[7]	Jan-08	.	None available
Exforge HCT	[8]	Apr-09	Sep-12	Amlodipine Besylate, valsartan & hydrochlorothiazide
Valturna	[9]	Aug-09	*	None available
Tekamlo	[10]	Aug-10	.	None available

Source: "Drugs@FDA: FDA Approved Drug Products," https://www.accessdata.fda.gov/scripts/cder/daf/ accessed August 4, 2017.
[B]: Approval of generic date is the first approval of any generic.
*Valturna was discontinued in July 2012.

16. With the exception of Starlix, these drugs are anti-hypertensive medications. Several of these are combinations of Novartis medications. For example, Exforge is a combination of Amlodipine and Valsartan, which are the key medicines in Lotrel and Diovan, respectively. Starlix is an anti-diabetic medication.

17. Several of these drugs have been major sources of revenue to Novartis. More recently, however, sales of the relevant drugs have declined (though, as demonstrated below, not by as much as sales of branded competitor drugs) primarily because of the entry of generic substitutes. As shown in Table 1 above, generic equivalents entered the market for two of the ten drugs at issue from 2002 through 2011. Despite increased competition from generics, several of these drugs continued to generate substantial revenue. For example, Diovan brought Novartis over $2.5 billion in net sales within the United States ($6.1 billion worldwide) in 2010.[14] Exforge brought in $284 million ($904 million

[14] Novartis Group, Annual Report for 2010, p. 161, accessed August 14, 2017, https://www.novartis.com/news/publications/archive.

worldwide) in 2010.[15] The data reflects that Novartis, unlike its brand name competitors, made a successful effort to maintain its market share in the face of this competition. According to Novartis's 2002 20-F report to the Security and Exchange Commission, the company responded to the competition from generics using several strategies including "marketing efforts to increase brand awareness and loyalty toward our products."[16]

18. Figure 1 plots the time trend in market shares for new prescriptions of anti-hypertensive drugs between 2003 and 2011. Market shares are calculated based on a set of 42 anti-hypertensive drugs – including 9 of the 10 drugs at issue, 24 branded competitors, and 9 generic competitors – provided to me by counsel.[17] The data concerning the comparator drugs is provided by IMS by doctor specialty and zip code, and I added prescription data for the drugs at issue from the IMS Xponent data in the Defendant's production.[18]

19. Figure 1 illustrates that Novartis maintained its market share even as the volume of generic prescriptions grew after 2006. Moreover, as shown in Figure 2, Novartis's market share of branded anti-hypertensive drugs increased from approximately 25 percent in 2006 to 50 percent in 2011. In contrast, as reflected in Figure 1, the other branded drug manufacturers saw substantial declines in market share, the overall volume of branded prescriptions fell by 70 percent with the entry of generic equivalents for Norvasc

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[15] Novartis Group, Annual Report for 2010, p. 161, accessed August 14, 2017, https://www.novartis.com/news/publications/archive.

[16] Novartis International AG, Form 20-F 2002 (2003), p. 34, accessed August 14, 2017, retrieved from the SEC EDGAR website http://sec.gov/edgar.shtml.

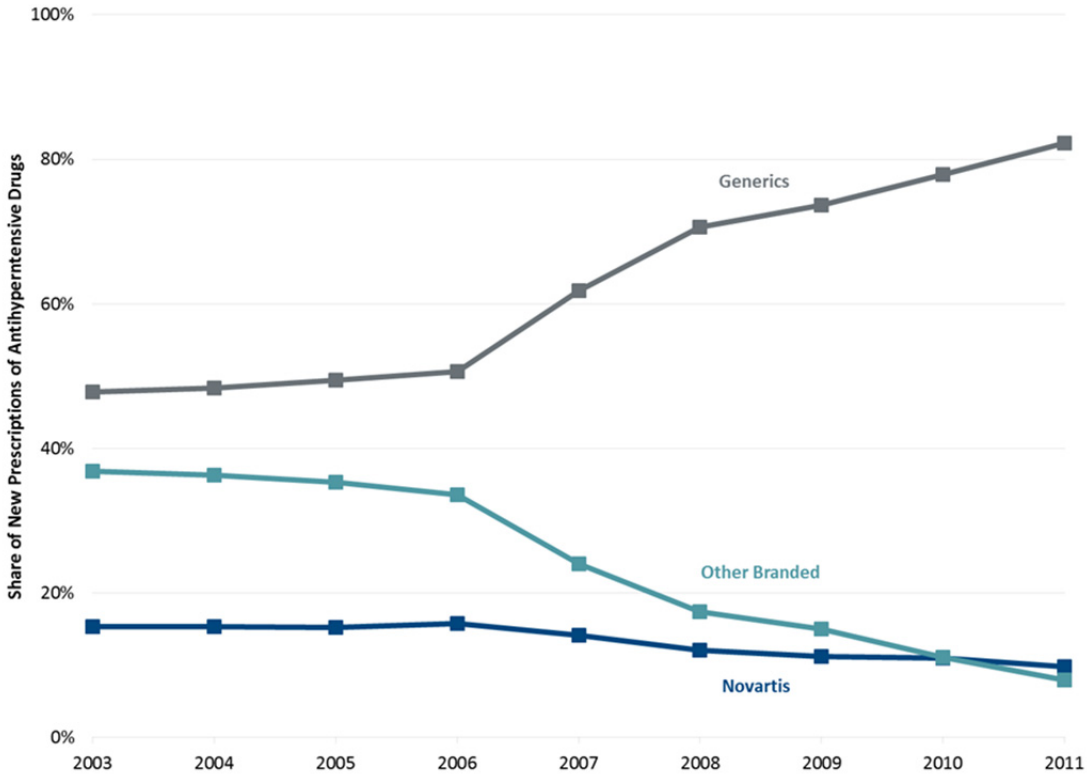
[17] Starlix is not included in the market shares figure because Starlix is an anti-diabetic, rather than anti-hypertensive, drug.

[18] IMS Comparator Drugs data; IMS Xponent.

Generic equivalents for Norvasc (amlodipine), Cozaar (losartan), and Hyzaar (hydrochlorothiazide/losartan) are missing from the IMS Comparator Drugs data. I impute prescriptions for these drugs by assuming that the total volume for the drug (branded plus generic) remains constant after its last full calendar year before the generic equivalent is approved. Without the imputation, the growth of generic drugs would be smaller, and Novartis's market share of anti-hypertensive drugs would appear larger. The imputation does not change Novartis's share of branded anti-hypertensive medications.

(manufactured by Pfizer) in 2007, Cozaar (Merck Sharp Dohme) in 2010, and Hyzaar (Merck Sharp Dohme) in 2010.[19]

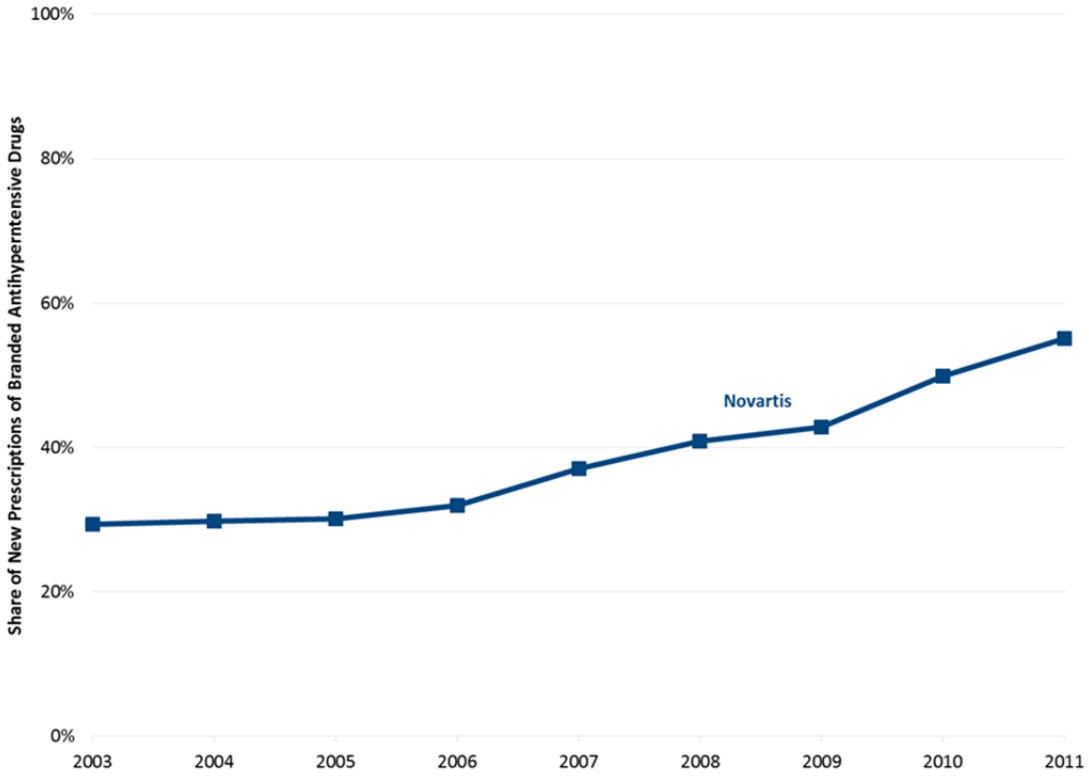
Figure 1: Novartis Maintained Its Share of New Prescriptions of Anti-Hypertensive Drugs in the Face of Rapid Growth by Generics



Source and Notes: IMS Comparator Drugs data for the comparator drugs; IMS Xponent for drugs at issue. The figure is based on volume of prescriptions across the U.S. and doctor specialty groups for 42 drugs, including the 9 anti-hypertensive drugs at issue.

[19] "Generic Norvasc Availability," Drugs.com, accessed August 14, 2017, https://www.drugs.com/availability/generic-norvasc.html; "Generic Cozaar Availability," Drugs.com, accessed August 14, 2017, https://www.drugs.com/availability/generic-cozaar.html; "Generic Hyzaar Availability," Drugs.com, accessed August 14, 2017, https://www.drugs.com/availability/generic-hyzaar.html.

Figure 2: Novartis's Share of New Prescriptions among Branded Anti-Hypertensive Drugs Steadily Increased between 2003 and 2011



Sources and Notes: See notes for Figure 1.

C. EVENTS AT ISSUE

20. Novartis spent substantial sums on marketing its drugs to compete with both its branded competitors[20] and generic manufacturers. In particular, Novartis ran a number of events designed to promote its drugs to doctors. These events included Speaker events, at which a doctor trained by Novartis was supposed to present a Novartis-approved slide deck to other doctors, and Roundtable events, at which a Novartis sales representative purportedly facilitated conversation about a drug with one or more doctors using Novartis-approved materials.

[20] Competing drug manufacturers of anti-hypertensive medications during the relevant period included Abbvie, Arbor Pharms LLC, AstraZeneca, Boehringer Ingelheim, Daiichi Sankyo, Pfizer, King Pharmaceuticals, Merck Sharp Dohme, Pfizer, and Sanofi Aventis US. Competing manufacturers of anti-diabetic drugs included Arbor Pharms LLC and Gemini Labs LLC (IMS Comparator Drugs data).

21. Table 2 shows the number of events and total spending on meals by drug and event type for the ten drugs at issue from 2003-2011.[21] Over this period, Novartis sponsored approximately 360,000 Roundtable and Speaker events with spending on honoraria and meals for these events totaling in excess of $367 million. Meal spending comprised roughly 44 percent of total spending on honoraria and meals. Speaker events account for 85 percent of honoraria and meals spending and 67 percent of total meal spending over the study period.

Table 2: Number of Events and Event Spending by Drug

		Diovan & Diovan HCT	Exforge & Exforge HCT	Lotrel	Starlix	Tekamlo	Tekturna & Tekturna HCT	Valturna	All Drugs
		[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]
Panel A: Number of Events									
Roundtable	[1]	124,329	10,551	51,039	1,991	-	15,284	-	203,170
Speaker Program	[2]	98,313	25,525	27,344	1,855	687	39,900	6,528	154,314
Total	[3]	222,642	36,076	78,383	3,846	687	55,184	6,528	357,484
Panel B: Total Spend on Honorarium and Meals (in millions of US dollars)									
Roundtable	[4]	$ 32.6	$ 2.9	$ 13.6	$ 0.7	-	$ 4.5	-	$ 54.3
Speaker Program	[5]	$ 199.9	$ 51.3	$ 54.3	$ 3.0	$ 1.7	$ 88.4	$ 15.5	$ 313.0
Total	[6]	$ 232.5	$ 54.2	$ 67.9	$ 3.7	$ 1.7	$ 92.9	$ 15.5	$ 367.4
Panel C: Total Meal Spend (in millions of US dollars)									
Roundtable	[4]	$ 32.6	$ 2.9	$ 13.6	$ 0.7	-	$ 4.5	-	$ 54.3
Speaker Program	[5]	$ 70.0	$ 17.7	$ 18.5	$ 1.0	$ 0.5	$ 30.7	$ 5.4	$ 109.3
Total	[6]	$ 102.6	$ 20.6	$ 32.1	$ 1.7	$ 0.5	$ 35.2	$ 5.4	$ 163.6

Source: Novartis's events database (Goldberg Report).
Notes: A unique event is defined as a unique Event ID. Events are filtered to those with confirmed attendees for which Dr. Goldberg was able to identify a NOVID. Events covering multiple drugs are counted under each drug. Since the "All Drugs" column (Column H) is the total number of unique events across all ten drugs at issue, the sum of number of events across the columns will be greater than the number of events for "All Drugs" because multi-drug events are only counted once. HCT versions are generally not distinguished for Diovan, Exforge and Tekturna in Novartis's database.

D. DOCTORS AT ISSUE

22. During the study period, approximately 171,000 doctors[22] participated in at least one Novartis-sponsored Roundtable or Speaker event for the ten drugs. For context, Table 3

[21] This data was assembled by Dr. Goldberg.

[22] Dr. Goldberg identified approximately 170,707 doctors who participated in a Novartis-sponsored Roundtable and Speaker event and who had NOVIDs that allowed Dr. Goldberg to track the same individual across events. There are additional participants for whom Dr. Goldberg did not have a

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shows the number of doctors of medicine in the U.S. between 1995 and 2013. Based on the numbers in the table below, on the order of 1 in 10 doctors may have participated in one of the events at issue in this case in 2005.[23]

Table 3: Active Doctors of Medicine in the United States, 1995-2013

Year	Number of doctors
1995	625,443
2000	692,368
2005	762,438
2010	794,862
2012	862,001
2013	854,698

Notes: National Center for Health Statistics (US).[24] An "active doctor" is defined by NCHS as one that is engaged in patient care or other professional activity for a minimum of 20 hours per week. Includes doctors of medicine and doctors of osteopathy.

V. Overview of Causality and Damages Analyses

23. To test whether kickbacks influenced prescription writing, I developed a model using information on the receipt of kickbacks by doctor and date from Dr. Goldberg's analysis of Novartis's events database and number of prescriptions by doctor, drug, and date from the IMS Xponent data that was produced by Novartis.[25] The model serves to identify whether and, if so, when kickbacks increased prescription rates by doctor, drug, and month.

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NOVID and, had they been included, the number of participants would have been greater than 170,707 (Goldberg Report, 15:11-19).

[23] There were at least 90,684 doctors who participated in Novartis events in 2005; 90,684 out of 762,438 is approximately 12 percent.

[24] National Center for Health Statistics (US), "Health, United States, 2015: With Special Feature on Racial and Ethnic Health Disparities," Hyattsville, MD, May 2016, pp. 282-284, accessed June 16, 2017, https://www.ncbi.nlm.nih.gov/books/NBK367640/pdf/Bookshelf_NBK367640.pdf. For definition of "active doctors," see Appendix II, p. 423.

[25] Novartis produced two IMS datasets, Xponent and PlanTrak. I elect to present my results based on Xponent because: (1) Lotrel, Starlix, and Valturna are only produced using Xponent data and (2) Xponent includes a larger set of doctors than PlanTrak. For the seven drugs in both Xponent and PlanTrak, there are more than 600K doctors in Xponent and approximately 588K doctors in PlanTrak.

Specifically, I focus on the effect of kickbacks on new prescriptions, as opposed to total prescriptions which include new prescriptions and refills. The reason for this decision is that doctors choose which drugs to prescribe at the time of writing a new script or reauthorizing a prescription but do not make an independent prescribing decision with respect to refills of existing prescriptions.[26]

24. Having identified doctors and months when kickbacks increased new prescription rates from the causality model, I calculated damages owed to the United States and state governments by summing up the relevant payments made for the new prescriptions for Covered Drugs that the doctors wrote in those months and payments made for subsequent refills of those prescriptions. I was instructed that this approach is proper in the context of this case. If the Court finds instead that some other standard governs, my approach can be easily adapted. I rely on prescriptions data for Medicare Part D, Medicaid, and TRICARE to implement this calculation.[27] I also understand that the United States may be entitled to penalties for each violation determined at trial, and I am prepared to calculate penalties using the number of violations and the appropriate dollar penalty per violation, as determined at or after trial.

25. Both the causality and damages analyses require the ability to follow the same doctor across datasets, namely between Novartis's events database (which is reflected in the datasets produced by Dr. Goldberg) and the prescriptions datasets. In Novartis's events database and the IMS data produced by Novartis, there is a common doctor identifier termed "NOVID." Novartis also provided a crosswalk that maps NOVID codes to National

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[26] In my report, I will refer to both new prescriptions and reauthorizations (or renewals) as "new prescriptions."

[27] I used the IMS data for the causality analysis in part because the dataset covers 2002 through 2011. In contrast, Medicare Part D data begins at the time when the program launched in January 2006, and the data availability for Medicaid varies across states, drug, and, for some drugs, time period; for example, I did not have data for Diovan, Exforge, and Tekturna before 2010 for most states.

Also, IMS data allows me to analyze the effect of kickbacks on the overall number of new prescriptions per doctor. The Medicare Part D, Medicaid, and TRICARE data exclusively reflects prescriptions written for enrollees of these government health programs. IMS data covers the wider population including privately insured individuals. The data is designed to be representative of prescriptions filled at retail, standard mail service, specialty mail service, and long-term care pharmacies in the U.S. and Puerto Rico (IMS Institute for Healthcare Informatics, "HSRN DATA BRIEF: Xponent™," August 2011).

Provider Identifier ("NPI") codes. Therefore, I used NOVID to link between Novartis's events database and IMS data, and I used NPI to link between Novartis's datasets and the government's Medicare Part D, Medicaid, and TRICARE datasets.

26. In the following sections, I first explain additional steps that I took to link doctors across the above referenced datasets in Section VI. I present the causality model and results in Section VII and the damages calculation in Section VIII.

VI. Linking Doctors who Met the Kickbacks Criteria with Their Prescription Rates

27. As mentioned in the previous section, I received two sets of data for my analyses:

a. Counsel provided me with datasets prepared by Dr. Goldberg that were derived from Novartis's events database.[28] The datasets characterize receipt of kickbacks by doctor, drug, and time period.

b. I was also provided with datasets reflecting prescriptions, broken out by doctor, drug, and date, for enrollees of Medicare Part D, Medicaid, and TRICARE, as well as prescription data from IMS that Novartis produced. [29, 30]

28. To link Novartis's events database with the prescription datasets, I use either NOVIDs or NPI codes.[31] The IMS datasets from Novartis include NOVID. The government

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[28] See Appendix B for the list of datasets that Dr. Goldberg prepared and are used in my analysis.

[29] I have enclosed a description of how I prepared the prescriptions datasets in Appendix C.

[30] For a description about differences between the IMS and government datasets, see footnote 27.

[31] "The National Provider Identifier (NPI) was adopted and became effective May 23, 2007 as the standard unique health identifier for health care providers to carry out a requirement in the Health Insurance Portability and Accountability Act of 1996 (HIPAA) for the adoption of such a standard." "Who is eligible to receive an NPI?" Centers for Medicare & Medicaid Services, accessed August 14, 2017, https://questions.cms.gov/faq.php?id=5005&faqId=1849. "HIPAA requires that covered entities (i.e., health plans, health care clearinghouses, and those health care providers who transmit any health information in electronic form in connection with a transaction for which the Secretary of Health and Human Services has adopted a standard) use NPIs in standard transactions by the compliance dates. The compliance date for all covered entities except small health plans was May 23, 2007; the compliance date for small health plans was May 23, 2008. As of the compliance dates, the NPI is the only health care provider identifier that can be used for identification purposes in standard transactions by covered entities." "What is the purpose of the National Provider Identifier (NPI), who

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prescriptions datasets do not have NOVID, but, instead, have various doctor identifiers including NPI codes, Drug Enforcement Agency ("DEA") codes, and Unique Physician Identification Numbers ("UPIN"). Because Novartis provided a table listing NOVIDs with their corresponding NPI codes, I can map doctor identifiers into NOVIDs so long as I have the doctor's NPI code.

29. In general, NPI codes are widely used, and I used NPI codes when available. Medicare-certified doctors are required to have NPI codes, and across most specialties (including general practice), at least 90 percent of physicians in the U.S. participated in Medicare in 2010.[32] As set forth above, there are other types of identifiers in the government prescriptions datasets, such as DEA and UPIN codes, particularly in earlier years. To map the other identifiers to NPI codes, I constructed a crosswalk of UPIN and DEA codes to NPI codes using CMS's STARs database.[33]

30. The number and percentage of doctors for whom I was able to find an NPI code and to match between Novartis's events database and the prescriptions dataset are shown in Table 4 below. Approximately 24 to 53 percent of doctors with NPIs or NOVIDs are matched to Novartis's events database (24 percent for IMS, 28 percent for Medicare, 45 percent for Medicaid, and 53 percent for TRICARE), and 36 to 43 percent of matched doctors received kickbacks. As evident in the table, doctors who met the kickbacks criteria wrote a disproportionate share of Novartis prescriptions; across the 10 drugs at issue, doctors who received kickbacks wrote more than 40 percent of prescriptions over the specified date ranges for Medicare Part D and TRICARE and more than 50 percent in IMS. Differences in the number of prescriptions between doctors who received kickbacks and those who did not will be the focus of the subsequent section.

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must use it, and when?" Centers for Medicare & Medicaid Services, accessed August 14, 2017, Centers for Medicare & Medicaid Services, accessed August 14, 2017, https://questions.cms.gov/faq.php?id=5005&faqId=1853.

[32] CMS, Data Compendium 2010 Edition, Table VI.8, accessed on August 9, 2017, (https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/DataCompendium/14_2010_Data_Compendium.html. The percent of general practice physicians participating in Medicare increased from approximately 89 percent in 2007 to 92 percent in 2010.

[33] See the list of files under "DEA, UPIN, and other IDs to NPI" heading in Appendix B.

Table 4: Number of Doctors Matched between Prescriptions Datasets and Novartis's Events Database and Volume of Prescriptions

	IMS	Medicare	Medicaid	TRICARE
Date range of dataset:				
Start date (month-year)	Jan-02	Jan-06	Mar-00	Jan-02
End date (month-year)	Dec-11	Dec-15	Dec-14	Dec-11
Number of doctors, in thousands:				
Total # doctors in the dataset	643.7	663.6	270.4	230.8
# doctors matched to an NPI or NOVID	643.7	518.7	138.9	188.3
# doctors matched to Novartis's Events Database	155.5	147.5	62.1	99.4
# matched doctors who met at least one criterion	55.3	54.1	26.6	41.9
# criterion-meeting doctors matched to IMS	55.3	53.8	26.6	41.9
Number of prescriptions (Rx), in thousands:				
Total # Rx in the dataset	345,186	106,953	13,209	8,833
# Rx for doctors matched to an NPI or NOVID	345,186	102,931	7,171	8,015
# Rx for doctors matched to Novartis's Events Database	290,779	81,086	5,430	6,610
# Rx for matched doctors who received kickback rewards	173,453	46,085	3,254	3,786
# Rx for criterion-meeting doctors matched to IMS	173,453	46,080	3,254	3,785

Source and notes: IMS Xponent, Medicare Part D, Medicaid, and TRICARE prescriptions data; Novartis events database (Goldberg Report). Numbers in the table reflect the 10 drugs at issue over the date ranges shown above.

VII. The Effect of Kickbacks on Prescription Rates for Drugs at Issue

31. To measure the effect of kickbacks on prescription rates, I developed a model using a database created for counsel by Dr. Goldberg that provides information about which doctors received kickbacks from Novartis for the ten drugs at issue and when each of these doctors received kickbacks. In this section, I first present descriptive statistics that illustrate differences in the average number of prescriptions written by doctors who did and did not receive kickbacks, as defined by the three criteria. In sub-sections VII.B and VII.C, I discuss my model specification and results.

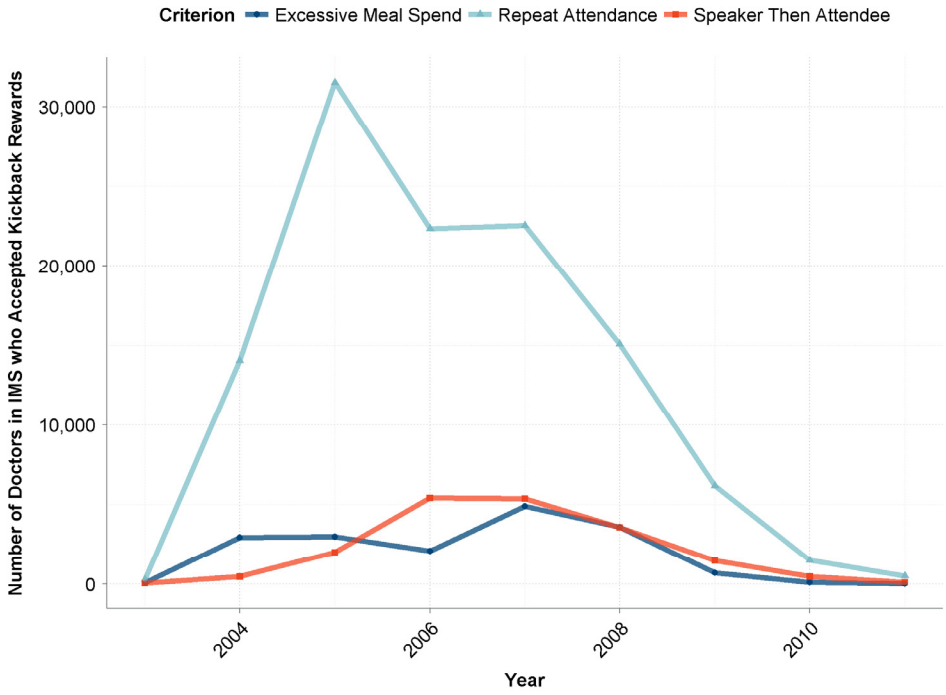
A. Doctors Who Met the Kickbacks Criteria Had Higher Prescription Rates than Doctors Who Did Not, On Average

32. In this section, I focus on differences in the prescription writing behavior between doctors who met the kickbacks criteria and doctors who participated in at least one Novartis event and did not meet the criteria or who did not participate in any Novartis events.

33. Among doctors who were matched between Novartis's events database and the IMS data, the number of doctors who received kickbacks by year is shown in Figure 3. Repeat Attendance is the most commonly met criterion, and the number of doctors who met the

criterion peaked at more than 30,000 in 2005. In 2007, approximately 5,000 doctors met the Excessive Meal Spend and Speaker-then-Attendee criteria.

Figure 3: Number of Doctors Who Met the Kickbacks Criteria by Criterion and Year



Notes: Novartis's events database from Goldberg Report; the figure is based on doctors who were found in both Novartis's events database and the IMS Xponent dataset. A doctor is identified by a unique NOVID.

34. As shown in Table 5, the average number of new prescriptions per doctor per month is 1.7-times to 4.2-times higher among doctors who met the kickback criteria relative to (a) doctors who participated in at least one Novartis event for one of the ten drugs at issue but did not meet any of the kickback criteria; and (b) doctors who did not participate in Novartis events for any of the ten drugs at issue from 2003 through 2011. Across all three groups of doctors, the average number of new prescriptions is highest in 2006. The ratio of the average number of new prescriptions is around 1.7 to 1.9 for doctors who met the criteria versus doctors who did not meet the criteria but had participated in Novartis events. The ratio between doctors who met the criteria and doctors who did not participate in Novartis events for the drugs at issue is between 3.0 and 4.2.

Table 5: Average number of new prescriptions across the ten drugs at issue per doctor per month, 2004-2011

	Average number of new Rx per doctor per month			Ratio of avg. for 'doctors who met criteria' to avg. for:	
	Doctors who met criteria	Doctors who participated and did not meet criteria	Doctors who did not participate in events	Doctors who participated and did not meet criteria	Doctors who did not participate in events
	[1]	[2]	[3]	= [1] / [2]	= [1] / [3]
2004	11.7	6.4	2.9	1.8	4.0
2005	12.0	6.5	2.9	1.8	4.1
2006	13.2	7.1	3.1	1.9	4.2
2007	12.0	6.4	3.0	1.9	3.9
2008	10.2	5.6	2.9	1.8	3.5
2009	10.0	5.6	3.0	1.8	3.4
2010	9.7	5.5	3.0	1.8	3.2
2011	8.6	5.0	2.9	1.7	3.0
Total: '04-'11	11.0	6.0	3.0	1.8	3.7

Notes: "Monthly average # new Rx" is the average number of new prescriptions (summed across all ten drugs at issue) per month per doctor from IMS Xponent. Each month is equally weighted in the average. "Doctors who met criteria" include doctors who met at least one kickbacks criterion between 2003 and 2011; "doctors who participated and did not meet criteria" include doctors who participated in at least one Novartis event for at least one of the ten drugs at issue but did not meet the kickbacks criteria throughout the period; and "doctors who did not participate in events" include doctors who were not matched between the IMS Xponent data and Novartis's events database.

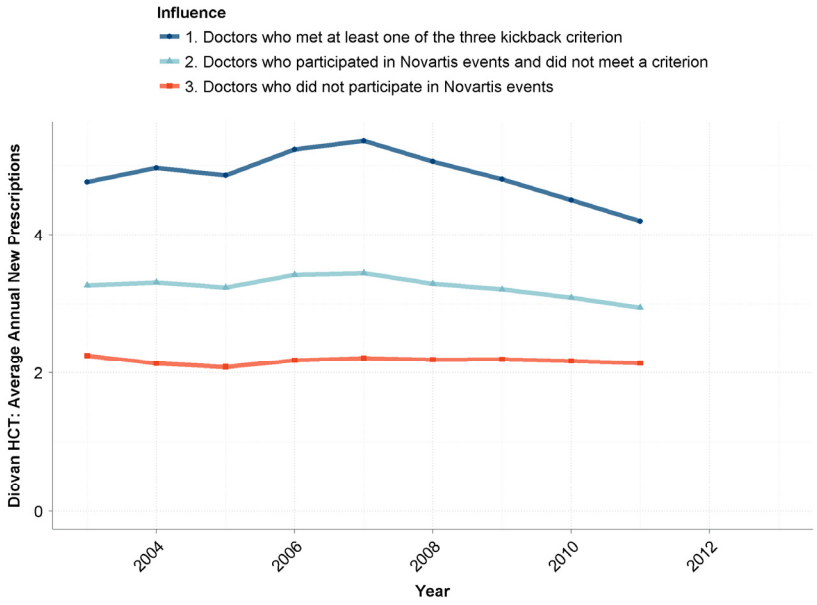
35. The differences in new prescription rates of doctors who met the kickback criteria and the two groups of doctors in columns 2 and 3 of Table 5 may be a result of kickbacks that occurred before 2004.[34] If so, then damages based on data from 2004 through 2011 would underestimate total damages for the study period. Upon request, I am prepared to calculate a bound on the additional damages that might be attributable to kickbacks prior to 2004, based on the ratios in Table 5 to doctors who are identified as having received kickbacks in years prior to 2004.

36. Figure 4, Figure 5, and Figure 6 depict the differences in average total prescriptions per month per doctor for three drugs – Diovan HCT, Lotrel, and Tekturna HCT. These drugs

[34] Similarly, the difference between average new prescription rates of 'doctors who participated and did not meet criteria' and 'doctors who did not participate in events' from 2004-2011 may be explained, in part, as a result of undercounting kickbacks among doctors who participated in Novartis events for the drugs at issue.

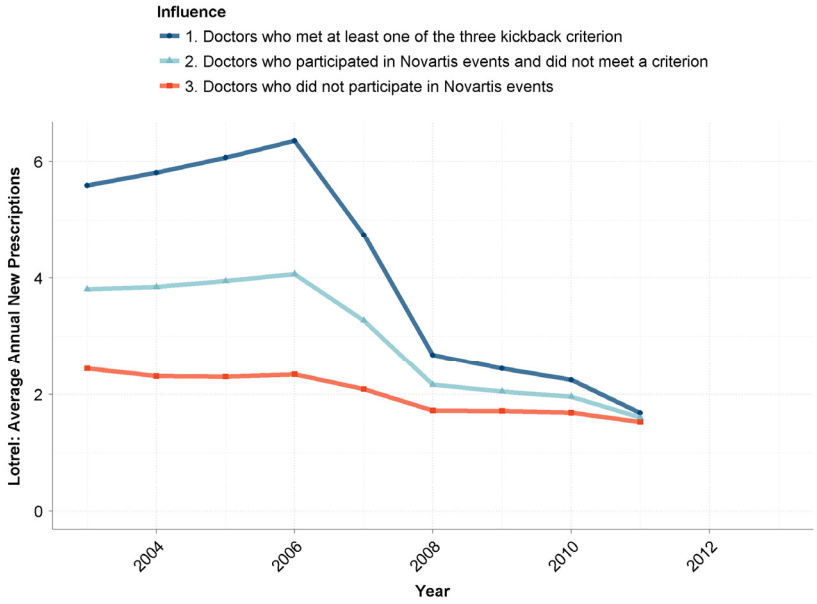
are illustrative of three scenarios: Diovan HCT had received FDA approval before 2003 and no generic equivalent entered the market during the period; Lotrel had been approved before 2002, and its generic equivalent was released in May 2007; and Tekturna HCT received FDA approval in January 2008. The figures demonstrate that – across these various scenarios – doctors who met the kickback criteria consistently prescribed more of the subject drugs on average than doctors who did not. Comparable figures for the ten drugs at issue using IMS data are enclosed in Appendix D.

Figure 4: For Diovan HCT, Doctors Who Met the Kickbacks Criteria Consistently Had a Higher Average Number of New Prescriptions



Sources and notes: Prescriptions data for Diovan HCT are sourced from IMS Xponent.

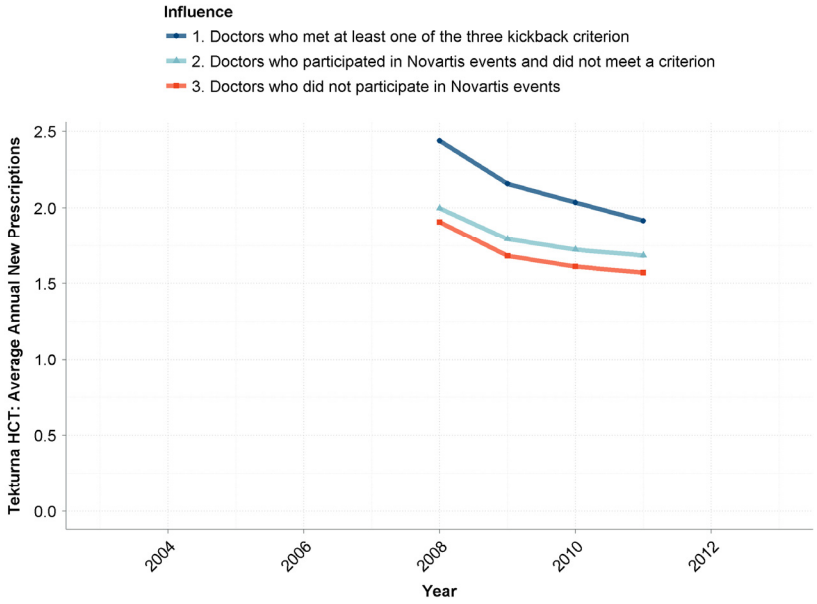
Figure 5: For Lotrel, Doctors Who Met the Kickbacks Criteria Continued to Write More Prescriptions after FDA Approval of a Generic Equivalent in May 2007



Sources and notes: Prescriptions data for Lotrel are sourced from IMS Xponent. For Lotrel, FDA approved a generic competitor in May 2007 (FDA letter[35] to TEVA Pharmaceuticals for ANDA 77-179 signed on 5/18/2007).

[35] Approval Letter: ANDA 77-179, Center for Drug Evaluation and Research, May 18, 2007, accessed on August 9, 2017, http://www.accessdata.fda.gov/drugsatfda_docs/appletter/2007/077179s000ltr.pdf.

Figure 6: For Tekturna HCT, Doctors Who Met the Kickbacks Criteria Had a Higher Number of Prescriptions from the Onset and Continued to Have Higher Prescription Rates



Sources and notes: Prescriptions data for Tekturna HCT are sourced from IMS Xponent. Tekturna HCT was approved by the FDA in January 2008.[36]

B. MODEL SPECIFICATION

37. As shown in the preceding section, doctors who received kickbacks wrote, on average, more prescriptions per month for the drugs at issue than other doctors. Factors in addition to kickbacks could contribute to differences in levels of prescription rates between doctors, such as variation in the mix of patients (along dimensions such as age, health insurance, or chronic health conditions). I use a statistical analysis that isolates the effect of kickbacks by controlling for other potentially confounding factors.

38. My model estimates how new prescriptions vary with the receipt of kickbacks. Given the numerical values of the inputs, the model predicts the number of new prescriptions that would be written under specified circumstances. The model focuses on new prescriptions, which include reauthorizations, because doctors make a prescribing decision at the time of

[36] "Approval Date(s) and History, Letters, Labels, Reviews for NDA 022107," U.S. Food & Drug Administration, accessed August 14, 2017, https://www.accessdata.fda.gov/scripts/cder/daf/index.cfm?event=overview.process&ApplNo=022107

writing new prescriptions or reauthorizing prescriptions.[37] In other words, a doctor decides whether to write a new prescription or to reauthorize a prescription, whereas refills typically occur without the doctor's intervention.

39. I use a shifted Poisson model with a doctor's monthly count of new prescriptions by drug as the outcome of interest.[38] The shifted Poisson model focuses on the number of new prescriptions written by a doctor in a month, given that he or she wrote at least one new prescription during the month. The model does not analyze whether a doctor would have written any prescriptions at all. If kickbacks increase prescription writing, then the shifted Poisson would yield a smaller prediction of the number of excess new prescriptions associated with kickbacks than a standard Poisson model – meaning that this choice of model is conservative. With the shifted Poisson model, doctors who have written prescriptions after receipt of kickbacks are assumed to continue writing at least one script in the absence of kickbacks.

40. I chose to implement a shifted Poisson model on doctors and months with positive new prescriptions because the prescriptions data available to me includes number of total (*i.e.,* new plus refills) and new prescriptions by doctor and time period for the ten drugs at issue only. Doctors appear in the prescriptions data if they wrote scripts for one of the ten drugs at issue during the month. I do not observe months when doctors did not write any prescriptions for Novartis's ten drugs.

41. The shifted Poisson model is shown in Equation 1 below:

Equation 1: Shifted Poisson Model for New Prescriptions

$$\Pr(Rx_{idt} | Rx_{idt} > 0) = \frac{\exp(-\lambda_{idt})\lambda_{idt}^{Rx_{idt}-1}}{(Rx_{idt}-1)!}$$

42. The model is defined using the following notation:

    a. i is the doctor identifier;

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[37] I identify new prescriptions in IMS data by 'nrx.' In the prescription datasets for Medicare Part D, Medicaid, and TRICARE, I identify new prescriptions as records with fill code equal to 0.

[38] In the economics literature, the Poisson model is a standard approach for modeling counts, such as number of visitors to the beach per day or number of doctor visits per month; see, for example, chapter 3 of A. Colin Cameron and Pravin K. Trivedi, *Regression Analysis of Count Data*, Econometric Society Monograph No.30, (Cambridge: Cambridge University Press, 1998).

b. d is the drug identifier;

c. t is the time (year and month) identifier;

d. $\lambda_{idt} = \exp(K_{idt}\beta_d + \delta_{id} + \gamma_{dt})$ is the propensity to prescribe drug d; where

i. δ_{id} is a doctor-specific effect for drug d;

ii. γ_{dt} is a time-specific effect for drug d;

iii. K_{idt} is a vector of the number of trigger events for any one of the kickbacks criteria that doctor i accumulated in each month beginning with 1 month prior (t-1) through 12 months prior (t-12);

iv. β_d is a vector of parameters that indicate the effect of kickbacks on prescribing behavior, the coefficient on K_{idt} in the propensity equation; and

e. Rx_{idt} is the number of new prescriptions, including reauthorizations, written in month t by doctor i for drug d.

43. This model includes a doctor-specific effect δ_{id} to account for variations in specialty and patient needs, and a time-specific effect γ_{dt} to account for variations in the availability and attractiveness of therapeutic substitutes. These effects capture the impacts on prescribing behavior that are due to time and to the nature of the physician's practice, so that the parameter vector β_d isolates the impact of kickbacks. The parameters of the model are estimated by a statistical procedure known as maximum likelihood. The shifted Poisson model has the property that the maximum likelihood estimates of doctor-specific effects can be solved for in terms of the remaining parameters, and substituted back in to concentrate the likelihood function, facilitating estimation. Once the parameters other than the doctor-specific effects have been estimated, they can be substituted in to calculate the estimates of the doctor-specific effects.

44. K_{idt} is constructed as a vector of the number of trigger events, for any one of the three criteria, per doctor and month from one month prior to 12 months prior. If the doctor met multiple criteria for the same event, the number of trigger events is counted as 1. If the doctor met one or more criteria at multiple events on the same day, the number of trigger events for that doctor and day is 1. This allows for the possibility that Novartis may have used separate Event IDs for different activities, *e.g.,* cocktail hour and dinner, on the same day and does not count each of those activities as a separate trigger event. K_{idt} includes

kickbacks associated with any one of the 10 drugs at issue. Thus my model allows for analysis of whether cross-over effects from trigger events associated with one drug affected prescription writing for a different drug.

45. Under the damage theory used in my analysis, the model properly accounts for cross-over effects in the damage calculation. If the receipt of kickbacks from events for one drug increases a doctor's propensity to prescribe other Novartis drugs, then cross-over effects will tend to be positive. On the other hand, if they induce the doctor to substitute the promoted drug for another Novartis drug, the cross-over effect can be negative. The introduction of new Novartis anti-hypertensive drugs beginning in 2007 may have introduced some negative cross-over effects.

46. For two drugs, namely Lotrel and Starlix, generic equivalents entered the market before the end of 2011. I allow the effect of kickbacks to differ before and after generic entry by including separate vectors of K_{idt} for prescriptions written before May 2007 or January 2008 (inclusive) and prescriptions written after these dates for Lotrel and Starlix, respectively.[39] The model results indicate that there are differential effects before and after the introduction of a generic equivalent for Lotrel.

47. Doctor-specific effects (δ_{id}) capture time-invariant characteristics of doctor i that would affect prescription rates. The doctor-specific effect captures the doctor's average prescription level for drug d and allows the baseline number of prescriptions to differ across doctors.[40] In other words, with doctor-specific effects, the model determines whether doctors change their volume of Novartis prescriptions after receiving kickbacks, relative to doctors who received no or fewer kickbacks.

48. Time-specific effects (γ_{dt}) capture factors that would affect all doctors in the same month. For example, a market-wide decrease in demand for Lotrel would be approximated by the

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[39] In the IMS data from Novartis, information on Starlix prescriptions after 2007 is missing; therefore, there is no period after the entry of generic equivalents for Starlix.

Alternatively, I could have included an interaction term for K_{idt} with an indicator that equals 1 after May 2007 or January 2008. The results would be equivalent under either specification.

[40] With doctor fixed effects, doctors who only have one month with positive prescriptions would be perfectly predicted by his or her fixed effect. Thus, these doctors with one month of positive prescriptions would not contribute to the estimation of the association between kickbacks and number of prescriptions.

time fixed effects for Lotrel, and all doctors prescribing Lotrel in that month would see a similar percentage drop in prescription rates.

49. The model is estimated on the IMS data by drug for prescriptions filled between 2004 and 2011. My analysis starts in 2004 because I do not have data on events before 2003, so that the vector of lagged kickback effects in 2003 is not observed. I estimate the model on IMS data, as opposed to the prescriptions data for the government programs, because doing so allows me to analyze the effect of kickbacks on new prescriptions in the mid-2000s. As shown in Figure 3, the omission of the mid-2000s would leave out a period with a large number of trigger events.[41] Using the IMS data also allows me to analyze the effect of kickbacks on a doctor's full universe of prescription writing and thus presents a more complete picture of the effect of kickbacks.

50. The model is estimated on all doctors in the IMS dataset. This set of doctors includes doctors who received Novartis's kickbacks based on the three criteria discussed above in ¶10, doctors who participated in Novartis events but did not meet any of the criteria, and doctors who did not participate in any Novartis event for the 10 drugs at issue between 2003 and 2011. The latter two categories of doctors allow me to identify the time trend in monthly new prescriptions in the absence of kickbacks.

51. The model presented in Equation 1 can be reformulated to predict, within the confines of the criteria and the data available to me, the number of prescriptions that would have been written absent the kickbacks, which can be used to identify a set of incremental prescriptions.[42] To do this, I calculate the expected value of Rx, equal to $1 + \lambda_{idt}$, at the

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[41] See footnote 27.

[42] As set forth above, the number of excess prescriptions identified by the model is based on the kickback criteria and the data available to me. For various reasons, this could result in an undercounting of the number of kickbacks which could, in turn, result in an undercounting of the number of incremental prescriptions. For example, to the extent the kickback criteria do not capture the full universe of kickbacks that the at-issue doctors received during the study period, then, assuming that those kickbacks had (on average) a similar impact on doctors' prescribing as the kickbacks identified here did, the number of incremental prescriptions would increase. Similarly, if Dr. Goldberg had been able to run the kickback criteria on events in 2002 and 2003 that are missing information needed for his algorithm (Goldberg Report, Table 1), and had produced results for that period similar to the results he produced for the subsequent period, then, assuming that those kickbacks had (on average) a similar impact on doctors' prescribing as the kickbacks identified here did, the number of incremental prescriptions would increase.

Continued on next page

estimated parameters β_d, δ_{id}, and γ_{dt} for both the "as is" and "but for" values of K_{idt}. The difference between the "as is" and "but for" expected number of prescriptions gives a number of incremental prescriptions associated with the kickbacks.

52. The number of incremental prescriptions as described above would be calculated as shown in Equation 2:

Equation 2: Predicted Number of Incremental Prescriptions from the Shifted Poisson Model

$$E[Rx_{idt}^{as}] - E\left[Rx_{idt}^{bf}\right] = \frac{\sum_{t\in T_{id}}\left(Rx_{idt}^{as}-1\right)}{\sum_{t\in T_{id}}\exp(\gamma_{dt}+\mathrm{K}_{idt}^{as}\beta_d)} \cdot \left(\exp(\gamma_{dt} + \mathrm{K}_{idt}^{as}\beta_d) - \exp\left(\gamma_{dt} + \mathrm{K}_{idt}^{bf}\beta_d\right)\right).$$

53. Rx_{idt}^{bf} is the number of new prescriptions in the "but for" world and Rx_{idt}^{as} represents the number of new prescriptions in the "as is" world. Similarly, K_{idt}^{bf} and K_{idt}^{as} are the vectors for the number of kickbacks received in the "but for" and "as is" worlds, respectively. T_{id} denotes the set of months when doctor i writes new prescriptions of drug d.

C. Model Results

54. To test whether kickbacks increased prescription rates, I computed the distribution of incremental prescriptions, aggregated across doctors and years, for each Covered Drug using the large-sample distribution of the Maximum Likelihood estimates.[43] The estimates are included in Appendix E. I used the distribution of incremental prescriptions to conduct t-tests at the 0.5 level as to whether the receipt of kickbacks increased new prescription rates. The results of the t-tests indicate that, for nine of the ten drugs at issue, new prescription rates were higher with Novartis's provision of kickbacks than in a but for

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Continued from previous page

In addition, there are other aspects of my model that are conservative, in the sense that they would tend to cause the model to understate the impact of kickbacks on doctors' prescribing. In particular, my use of doctor fixed effects to control for variation in a doctor's patient populations means that the impact of kickbacks not identified by the criteria (during periods in which a doctor does not receive an identified kickback) are treated as part of the doctor's ordinary prescribing; this decreases the impact of the identified kickback events as estimated by the model.

[43] The computation is carried out by drawing a sample of 1,000 parameter vectors from the asymptotic distribution and aggregating the results of Equation 2 across doctors and years for each vector.

world without kickbacks.[44] In other words, the t-tests indicate that kickbacks increased new prescriptions for the drugs at issue.

55. Table 6 presents the results of the analysis. For Tekamlo, I accept the hypothesis at the 0.5 percent level that kickbacks did not increase new prescriptions. One could reject further, at this significance level, that kickbacks had any effect on Tekamlo prescriptions during the study period. Therefore, I exclude Tekamlo from the damages calculations. I also accept the hypothesis that kickbacks did not increase new prescriptions for Lotrel after entry of its generic equivalent, and I exclude new prescriptions for Lotrel after May 2007 from damages.

Table 6: T-Test of Average Total Incremental New Prescriptions Indicates that Kickbacks Increased New Prescriptions for Drugs at Issue

	Avg. Total Incremental New Rx across Simulations	Standard Error	T-Statistic	Is there < 0.5% chance that the incremental is non-positive?
Diovan	244,218	2,034	120	Yes
Diovan HCT	282,362	2,092	135	Yes
Exforge	43,608	635	69	Yes
Exforge HCT	1,011	199	5	Yes
Starlix	2,738	599	5	Yes
Tekamlo	-178	96	-2	No
Tekturna	26,522	505	53	Yes
Tekturna HCT	2,011	282	7	Yes
Valturna	837	285	3	Yes
Lotrel: Before Generic	146,015	2,043	71	Yes
Lotrel: After Generic	-4,572	516	-9	No

Notes: The results are based on 1000 draws from the asymptotic normal distribution of the estimated coefficients for the vector of kickbacks and time fixed effects. An incremental new prescription is the difference total expected new prescriptions with kickbacks and total expected new prescriptions without kickbacks. The t-statistic is calculated as the ratio of the average new prescriptions divided by the standard error.

56. As confirmation of the t-test results, I conduct the Likelihood Ratio ("LR") test. The LR test compares how well two different models – one of which includes lagged kickbacks and the other does not have kickbacks – fit the prescriptions data. I find that the LR test

[44] For Lotrel, I conducted a t-test for whether kickbacks increased prescription writing before its generic equivalent received FDA approval in May 2007 and a separate test for after May 2007 (inclusive).

supports the inclusion of the kickbacks indicators in the model, and the chi-squared test statistics and p-values are included in Appendix E.

VIII. Damages for Prescriptions Associated with Kickbacks

A. Instruction

57. I was instructed to calculate damages based on the total number of prescriptions written by a given doctor during the period when my modeling reflects was that a doctor was influenced by kickbacks. The shifted Poisson model in Equation 1 identifies the months when a doctor was influenced by kickbacks. I compute damages as the sum of new prescriptions written in those periods and their subsequent refills extending into future periods.

B. Summary of Damages

58. Table 7 reports the number of prescriptions written and associated payments made by the relevant government health care programs for new prescriptions of the Covered Drugs that were written between 2004 and 2011 when a kickback-receiving doctor was influenced by kickbacks. The numbers exclude prescriptions for Diovan, Exforge, and Tekturna that were dispensed before January 1, 2010. The numbers exclude prescriptions for Lotrel that were dispensed after April 30, 2007 and prescriptions for Tekamlo.

Table 7: Summary of Damages across Nine Drugs at Issue, by Health Care Program

	Number of Rx, in thousands	Damages, in US$ millions
Medicare Part D (2006-2015)	6,168	$327,860
Medicaid (2004-2011)		
FFS - U.S.	500	$20,100
FFS - States	379	$12,409
Managed Care - U.S.	307	$13,497
Managed Care - States	305	$13,269
TRICARE (2004-2011)	563	$49,419
Total: Gov. Programs	7,538	$436,555

Notes: Prescriptions data from Medicare Part D, Medicaid, and TRICARE. Payment information for Medicare Part D is based on government impact from MEDIC. Payment information for Medicaid and TRICARE are included in the prescriptions data. Medicaid breakout for FFS and MC between states and U.S. is based on FMAP. Damages for Medicare Part D span the period 2006-2015. Damages for Medicaid and TRICARE are based on scripts between 2004 and 2011. Damages exclude new prescriptions and subsequent refills for Tekamlo and Lotrel after May 2007. Total Gov. Programs does not equal the sum across the rows because prescriptions may be counted twice under Medicaid – once for federal and again for states.

C. Approach to the Damages Calculation

59. Table 8 shows the number of doctors who were influenced by kickbacks by drug and year. For each doctor in the table, his/her expected number of new prescriptions in a given month in the "as is" world with kickbacks exceeded his/her expected number of prescriptions during the same month in the "but for" world without kickbacks.[45] In

[45] As I noted in ¶24, I am able to adapt my model to accommodate alternative standards that the Court may deem appropriate for determining damages. For example, I can calculate the number of doctors who would have written fewer new prescriptions but for kickbacks, after excluding kickbacks from events associated only with Diovan, Exforge, or Tekturna (but not the HCT versions of those drugs) before 2010, and then calculate damages based on the prescriptions by these doctors. Appendix F includes a table analogous to Table 8 and a set of damages calculations under this scenario. I could also alter my damages approach to calculate damages based on all Novartis prescriptions written by a doctor, through November 30, 2011, after receipt of a kickback.

In Appendix G, I separately report the subset of damages that may be ascribed to incremental new prescriptions, based on Equation 2 and information on kickbacks available to me at this time, and their subsequent refills. There are two sets of tables for these damages in Appendix G that correspond to two scenarios reflecting different approaches to the but for world: (1) a but for excluding all kickbacks and (2) a but for excluding kickbacks from events associated with Covered Drugs.

context, approximately 95 percent of doctors who received kickbacks and were matched to the IMS data would have prescribed fewer new prescriptions but for kickbacks.[46]

Table 8: Number of Doctors Who Would Have Had Fewer New Prescriptions but for Kickbacks

	2004	2005	2006	2007	2008	2009	2010	2011	Total: Any Year
Diovan	12,293	31,797	36,473	31,010	26,680	16,331	6,582	1,959	51,233
Diovan HCT	11,859	30,564	35,301	30,193	26,128	16,114	6,463	1,910	49,846
Exforge				10,865	15,825	11,094	4,814	1,619	18,767
Exforge HCT						2,764	2,052	908	3,430
Lotrel	11,679	30,181	34,646	22,036					40,012
Starlix	4,768	11,827	13,458	10,020					18,875
Tekturna				10,407	13,259	9,276	4,045	1,468	16,844
Tekturna HCT					3,826	3,935	1,929	816	5,489
Valturna						522	1,688	959	1,947
Total: Any Drug	12,952	33,408	37,777	32,249	27,488	17,054	7,012	2,003	52,393

Notes: Table reports the number of doctors with positive incremental new prescriptions based on the shifted Poisson model estimated on IMS data. Each cell reports the number of unique doctors based on NOVID; thus, "Total: Any Drugs" and "Total: Any Years" are not the sum across the rows or columns, respectively, to avoid double-counting doctors. IMS data for Starlix is missing after 2007 (exclusive). Damages exclude new prescriptions and subsequent refills for Tekamlo and Lotrel after May 2007.

60. In order to calculate damages including refills, I developed an algorithm to account for new prescriptions and refill of prescriptions that were written by doctors who were influenced by kickbacks. The algorithm is shown in Equation 3, where $TotalRx_{dt}$ stands for the total number of prescriptions (new prescriptions and refills) associated with kickbacks for drug d at time t:

Equation 3: New Prescriptions and Refills Associated with Kickbacks by Drug and Period

$$TotalRx_{dt} = \sum_{i} \left(S_{idt} \cdot Rx_{idt} + \sum_{n \geq 1} S_{idt-n} \cdot Re_{id,t-n,t} \right),$$

where i is the index for doctor; d for drug; and t for month. Rx_{idt} is the count of new prescriptions written by doctor i for drug d at time t, and Re_{idtq} is the count of refills that were filled in time period q for a new prescription in time t. S_{idt} is an indicator variable

[46] (52.4 / 55.3) x 100 percent) = 95 percent, where 55.3 is the number of doctors who received kickbacks and were matched to IMS (see Table 4).

that equals 1 when the doctor is influenced by kickbacks, *i.e.,* the doctor would have written fewer new prescriptions for drug d in the "but for" world, and equals 0 otherwise.

61. Let $Damages_{dt}$ represent damages for drug d at time t, and C_{idt} is the cost to a government health care program per prescription of drug d by doctor i in time t. Then damages for total prescriptions associated with kickbacks is calculated as:

Equation 4: Damages for Prescriptions Associated with Kickbacks by Drug and Period

$$Damages_{dt} = \sum_{i} C_{idt} \left(S_{idt} \cdot Rx_{idt} + \sum_{n \geq 1} S_{idt-n} \cdot Re_{id,t-n,t} \right).$$

62. Equation 3 and Equation 4 are adaptable to different "but for" scenarios. Also, rather than taking on values of either 0 or 1, S_{idt} may be a fraction, such as 0.5 or 0.05.[47] The interpretation would be that prescriptions and payments owed to the United States and the state government in damages are a share of prescriptions for drug d written by doctor i in month t.[48]

63. In the three government datasets, I track a new prescription for a given drug using a patient identifier, prescriber (or doctor) identifier, date dispensed, and fill code. Refills, *i.e.,* prescriptions with a fill code greater than 0, are associated with the nearest preceding prescription (based on date dispensed) for the same patient, prescriber, and drug with fill code 0.

64. C_{idt} is specific to the government health care program.

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[47] For example, I can calculate damages based on any number of incremental new prescriptions and their subsequent refills by using alternative vectors of S_{idt}.

[48] As mentioned in footnote 10, I am not able to apply the damages approach shown in Equation 4 to a subset of states and Washington, D.C. for Medicaid because of data limitations. In the event that the necessary data remains unavailable, I am prepared to use approximate methods. For example, I can calculate the number of doctors who met the criteria and whose practice is located in the state and apply the average number of influenced prescriptions and payments.

There are other approaches that may be available. For example, for states that are missing fill codes but not NPI codes, I can calculate the total number of prescriptions (new prescriptions and refills) written by doctors who were influenced by kickbacks by month and drug. Note that this calculation differs from the method described above because I would not be able to track refills associated with a new prescriptions that was written while a doctor was influenced by kickbacks.

a. For Medicare Part D, I rely on annual government impact numbers by doctor and drug that were computed by Medicare Drug Integrity Contractor ("MEDIC"), a contractor for CMS. The calculation of the government impact number involves three parts: reinsurance, low income cost-sharing subsidy, and risk sharing. A description of MEDIC's methodology is included in Appendix H. Since MEDIC provides government impact numbers by year, I divide the annual payment by the number of prescriptions associated with doctor i for drug d in the same year to obtain government impact per prescription. For a given doctor and drug, all months in the same calendar year would have the same cost (*i.e.,* government impact) per prescription.

b. For Medicaid and TRICARE, I aggregate the amount paid by the government[49] for each prescription associated with kickbacks. Since I know the exact amount paid by the government for each claim, I am able to calculate damages as $D_{dt} = \sum_i \left(S_{idt} \cdot P\_Rx_{idt} + \sum_{n \geq 1} S_{idt-n} \cdot P\_Re_{id,t-n,t} \right)$, where P_Rx_{idt} and $P\_Re_{id,t-n,t}$ are the amounts paid by the government for a prescription written by doctor i for drug t in month t.

65. For Medicaid, I separate out the amount paid by the United States versus state governments using the Federal Medical Assistance Percentage ("FMAP") that are annually published by U.S. Department of Health and Human Services.[50] I also separate out damages associated with managed care.

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[49] In the Medicaid dataset, the amount paid by the states and United States for the prescription is "amount paid." Amounts paid by Medicare and other insurers are reported in separate data fields. In TRICARE, the amount paid by the government is "submitted amount."

[50] See "Federal Medical Assistance Percentages or Federal Financial Participation in State Assistance Expenditures FMAP," Office of the Assistant Secretary for Planning and Evaluation, March 1, 2015, accessed August 14, 2017, https://aspe.hhs.gov/federal-medical-assistance-percentages-or-federal-financial-participation-state-assistance-expenditures. For 2003 and 2004, I use the FMAP percentages reported by the Government Publishing Office because a number of states are missing information from the "Temporary Increase for Quarters in FY 2003 and FY 2004" on the DHHS website. 68 Fed. Reg. 35890, June 17, 2003, accessed August 4, 2017, https://www.gpo.gov/fdsys/pkg/FR-2003-06-17/pdf/03-15274.pdf.

D. DAMAGES BROKEN DOWN BY GOVERNMENT HEALTH CARE PROGRAM

66. Table 9, Table 10, and Table 11 present damages by drug for Medicare Part D, Medicaid, and TRICARE, respectively. Each table reports, based on the data currently available to me, the number of prescriptions associated with months when doctors were influenced by kickbacks and the total amount paid by the federal and/or state governments for those prescriptions. 'Number of Rx' and 'Amount Paid' are calculated based on Equation 3 and Equation 4.

67. In total, damages related to Medicare Part D prescriptions is $328 million as shown in Table 9.

Table 9: Damages for Medicare Part D, 2006-2015

	Medicare Part D	
	Number of Rx	**Amount Paid**
Diovan	358,303	$21,847,035
Diovan HCT	3,912,539	$195,997,736
Exforge	101,114	$6,929,952
Exforge HCT	21,308	$1,379,098
Lotrel	1,483,461	$82,132,940
Starlix	157,137	$11,550,645
Tekturna	75,111	$4,726,400
Tekturna HCT	44,459	$2,526,921
Valturna	14,879	$769,650
Total: All Drugs	6,168,311	$327,860,377

Notes: Number of Rx includes (i) new prescriptions that were written during a month when the doctor was influenced by kickbacks and (ii) the subsequent refills of these new prescriptions. Medicare Part D prescriptions data comes from CMS. Amount Paid is based on the MEDIC government impact numbers. For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted.

68. For Medicaid (see Table 10 below), based on the data currently available to me, the total amount owed for prescriptions under Fee-For-Service plans is around $33 million between

the United States and the state governments.[51] A table listing prescriptions and amount paid by state for Fee-For-Service is included in Appendix I.

69. For managed care, I understand that the government may seek to claim damages for managed-care prescriptions in some or all states and that the methodology I applied to calculating Fee-For-Service damages may be appropriate for some or all of these states. Accordingly, in Appendix J, I list the prescriptions and amount paid by state, using the approach for calculating damages described above. To the extent I learn that damages should be calculated differently for some states, I can easily adjust my analysis. Across the Covered Drugs and all states, and based on the data currently available to me, the total amount of damages associated with managed care beneficiaries is $27 million.

Table 10: Damages for Medicaid, 2004-2011

	Medicaid FFS - U.S.		Medicaid FFS - States		Medicaid MC - U.S.		Medicaid MC - States	
	Number of Rx	Amount Paid	Number of Rx	Amount Paid	Number of Rx	Amount Paid	Number of Rx	Amount Paid
Diovan	16,000	$783,497	11,504	$543,523	2,812	$151,832	2,508	$129,615
Diovan HCT	314,779	$11,627,027	244,941	$7,607,009	188,598	$8,099,767	187,433	$7,933,358
Exforge	7,564	$327,537	5,737	$190,449	403	$23,505	328	$18,449
Exforge HCT	976	$54,177	480	$23,128	40	$2,893	27	$2,054
Lotrel	133,212	$6,019,859	94,990	$3,269,152	93,856	$4,176,081	93,856	$4,150,704
Starlix	18,217	$968,250	13,083	$546,191	11,305	$641,356	11,305	$640,180
Tekturna	3,466	$134,983	2,825	$91,633	401	$23,877	350	$19,935
Tekturna HCT	4,600	$149,997	4,061	$114,332	6,942	$273,239	6,919	$270,161
Valturna	1,042	$34,534	905	$23,697	2,704	$104,669	2,702	$104,545
Total: All Drugs	499,856	$20,099,860	378,526	$12,409,115	307,061	$13,497,218	305,428	$13,269,002

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent refills from Medicaid data. Amount Paid is reported in the Medicaid data under the field, "amount paid." FFS stands for Fee-for-Service. For both FFS and Managed Care, payments to the United States and state governments are apportioned using the annual Federal Medical Assistance Percentages. The portion allocated to the United States includes all states whereas the portion allocated to state governments includes only the states in relator's Third Amended Complaint (July 10, 2013). For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted.

70. Table 11 presents TRICARE damages, which amount to $49 million across 560,000 prescriptions.

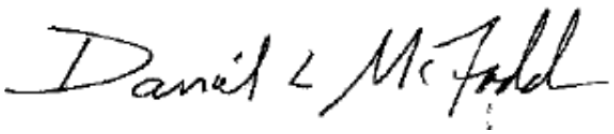
[51] The United States claims its portion in all states. Only relator states that are listed in the relator's Third Amended Complaint (26July 10, 2013) are included in the analysis; see footnote 9.

Table 11: Damages for TRICARE, 2004-2011

	TRICARE	
	Number of Rx	**Amount Paid**
Diovan	13,430	$1,244,445
Diovan HCT	307,926	$25,073,095
Exforge	6,774	$787,720
Exforge HCT	2,110	$245,424
Lotrel	199,923	$18,480,261
Starlix	19,290	$2,313,303
Tekturna	5,669	$581,686
Tekturna HCT	5,637	$504,877
Valturna	1,911	$188,546
Total: All Drugs	562,670	$49,419,357

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent fills from TRICARE prescriptions data. Amount Paid is reported in the TRICARE data under the field, "submitted amount." For Diovan, Exforge, and Tekturna, total and excess prescriptions prior to January 2010 are excluded. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted.

Signed in Berkeley, CA on August 14, 2017.



Daniel L. McFadden

Appendix A. Curriculum Vitae

Daniel L. McFadden
Principal

San Francisco, CA +1.415.217.1000 Daniel.McFadden@brattle.com

Professor Daniel McFadden is a principal with The Brattle Group, which provides consulting services and expert testimony on economic, finance, regulatory and strategic issues to corporations, law firms and public agencies worldwide.

Professor Daniel McFadden, recipient of the 2000 Nobel Prize in Economics, is the E. Morris Cox Professor Emeritus of Economics at the University of California at Berkeley and the founding director of its Econometrics Laboratory. He is also the Presidential Professor of Health Economics at the University of Southern California, where he has joint appointments at the USC Sol Price School of Public Policy and the Department of Economics at USC Dornsife College. Previously, he was the James R. Killian Professor of Economics at MIT, the Irving Fisher Research Professor at Yale University, and the Fairchild Distinguished Scholar at the California Institute of Technology. He was awarded the Nobel Prize for his numerous contributions to quantitative economic science and, in particular, his pioneering theoretical, methodological, and empirical work in the analyses of discrete choices. Dr. McFadden has received numerous other awards including the John Bates Clark Medal given every two years to the American economist under the age of forty who has made the most outstanding contribution to the field of economic science. Dr. McFadden received his Ph.D. in Economics from the University of Minnesota in 1962. There he also earned his B.S. in Physics, with high distinction, in 1957.

Dr. McFadden has also held the following academic appointments:

2014-	Presidential Professor of Health Economics, University of Southern California
1996-	Director, Econometrics Laboratory, University of California, Berkeley
1995-1996	Chair, Department of Economics, University of California, Berkeley
1991-1995	Director, Econometrics Laboratory, University of California, Berkeley
1990-	E. Morris Cox Chair, University of California, Berkeley
1990-	Professor of Economics, University of California, Berkeley
1990	Sherman Fairchild Distinguished Scholar, California Institute of Technology
1986-1991	Director, Statistics Center, Massachusetts Institute of Technology
1984-1991	James R. Killian Chair, Massachusetts Institute of Technology
1978-1991	Professor of Economics, Massachusetts Institute of Technology
1977-1978	Irving Fisher Research Professor, Yale University
1968-1979	Professor of Economics, University of California, Berkeley
1966-1967	Visiting Associate Professor, University of Chicago
1966-1968	Associate Professor of Economics, University of California, Berkeley
1963-1966	Assistant Professor of Economics, University of California, Berkeley
1962-1963	Assistant Professor of Economics, University of Pittsburgh
1961-1962	Instructor, Economics, University of Minnesota
1959-1960	Research Assistant, Social Psychology, University of Minnesota
1957-1958	Instructor, Physics, University of Minnesota

EXPERIENCE

Dr. McFadden has had a varied background in professional and public service. Among his achievements are:

- President, American Economic Association (AEA) (2005)
- Chair, National Academy of Science (NAS) Section 54 Economic Sciences (2003-)
- Chair, NAS Committee on Methods of Forecasting Demand and Supply of Doctoral Scientists and Engineers (1997-2000)
- Advisory Committee, Journal of Applied Economics (1996-)
- NAS Commission on Science, Engineering, and Public Policy (1995-)
- Chair, AEA Committee on Electronic Publication (1994-)
- Vice President, American Economics Association (1994)
- NAS Committee on Behavioral and Social Sciences and Education (1989-1994)
- Panel Study of Income Dynamics, Advisory Board (1988-1991)
- Executive Committee, American Economics Association (1985-1987)
- President, Econometric Society (1985)
- Executive Committee, Econometric Society (1983-1986)
- Council of the Econometric Society (1983-1986)
- Vice President, Econometric Society (1983-1984)
- NAS Committee on Energy Demand Modeling (1983-1984)
- NAS Committee, Basic Research in the Social Sciences (1982-1987)
- Chair, AEA Awards Committee (1981-1984)
- Board of Directors, National Bureau of Economic Research (1980-1983)
- Editor, Econometric Society Monographs (1980-1983)
- Review Committee, California Energy Commission (1979)
- Sloan Foundation Book Committee (1977-1979)
- Executive Committee, Econometric Society (1978-1980)
- Board of Editors, Transportation Research (1978-1980)
- Associate Editor, Journal of Econometrics (1977-1978)
- Board of Directors, National Bureau of Economic Research (1976-1977)

- Executive Committee, Transportation Research Board (1975-1978)
- City of Berkeley, Coordinated Transit Project (1975-1976)
- Advisory Committee on Transportation Models, Metropolitan Transportation Commission (1975)
- Council of the Econometric Society (1974-1980)
- Elected Member, Universities National Bureau (1974-1977)
- Board of Editors, Journal of Mathematical Economics (1973-1977)
- Board of Editors, American Economic Review (1971-1974)
- Chair, NSF-NBER Conference, Economics of Uncertainty (1970-)
- Economics Advisory Panel, National Science Foundation (1969-1971)
- Editor, Journal of Statistical Physics (1968-1970)

MIT – RELATED:

- Committee on Curricula, 1990-91
- Killian Award Committee, 1984
- Center for Energy Policy Research, Program Board, 1983-84
- Engineering Dean Search Committee, 1980-81
- Provost's Committee on Statistics, 1979-80
- CTS Advisory Board, 1978-79

BERKELEY – RELATED:

- Director of Graduate Studies, 1994-95
- IBER Advisory Committee, 1993-95 (Chair, 1994-95)

PROFESSIONAL AFFILIATIONS

- American Economics Association
- The Econometric Society
- American Statistical Association
- Mathematical Association of America
- Transportation Research Board

FELLOWSHIPS, SCHOLARSHIPS, HONORS, AND AWARDS

- Honorary Degree, University of Montreal (2004)
- Honorary Degree, University College London (2003)
- Richard Stone Prize in Applied Econometrics (2000-2001)
- Nobel Prize in Economics (Joint Recipient) (2000)
- Nemmers Prize in Economics, Northwestern University (2000)
- American Agricultural Economics Association, Best Paper Prize (1994)
- University of Chicago, LLD (1992)
- Frisch Medal, Econometric Society (1986)
- Elected to National Academy of Science (1981)
- Outstanding Teacher Award, MIT (1981)
- Fisher-Schultz Lecture, Econometrics Society (1979)
- Elected to American Academy of Arts and Sciences (1977)
- John Bates Clark Medal, American Economics Association (1975)
- Elected Fellow, Econometrics Society (1969)
- Ford Faculty Research Fellow (1966-1967)
- Mellon Post-Doctoral Fellow (1962-1963)
- Earhart Fellow (1960-1961)
- Ford Foundation Behavioral Science Fellow (1958-1962)

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EXPERT TESTIMONY & CONSULTING

In an administrative law case, *U.S. DOE vs. Cities Service Corp.*, I prepared written testimony and testified in support of defendant Cities on alleged damages from overcharges. My analysis considered the issue of the marginal cost of production of "new oil" and the econometric techniques appropriate for this analysis. (1987)

In the patent damages case of *Polaroid v. Kodak,* I served as a consulting expert to Polaroid on the economic theory of the case and the methodology used to estimate damages. (1989)

In the case of *U.S. DOJ vs. Exxon Company USA*, arising from the Exxon Valdez oil spill, I prepared for Exxon estimates of damages from loss of recreational opportunities. I was not deposed and did not testify prior to settlement of the case. However, I subsequently testified before a NOAA rule-making committee on some aspects of environmental damage assessment. (1990-1992)

In the case of *Northern Industries vs. Portec*, a contract dispute, I analyzed the market for railroad cranes on behalf of defendant Portec to determine whether the plaintiff was damaged, and critiqued a NERA analysis. I was deposed and testified. (1991-1994)

On behalf of defendant Atlantic Richfield Company, I submitted an expert report and was deposed in the case of *State of Montana vs. ARCO*, which involved contamination of streams arising from historical smelter operations of Anaconda Copper Company. My analysis considered the valuation of damages to consumer welfare from the contamination. (1993-1998)

I was deposed and testified on behalf of the defendants in the Industrial Excess Landfill case, a class action against Goodyear, Goodrich, and Firestone Rubber companies. My analysis focused on the estimation of damages from stigma. (1994-1995)

I was deposed in the case of *Apple Computer vs. ICSOP*. On behalf of the defendants, I analyzed the economic basis for allocation of a settlement between Apple Inc. and Apple Computer in a case involving trademark infringement and licensing of future use. (1995)

I submitted an expert report and was deposed in a case alleging unjust enrichment from trade secrets, *American Airlines vs. Northwestern Airlines*. On behalf of the defendant, I critiqued the damage analysis of the plaintiff's experts. (1997)

I submitted an expert report, was deposed, and testified on behalf of Globe Metallurgical who was a defendant in a price-fixing civil anti-trust suit in the ferrosilicon products industry. My analysis focused on the reliability of the methodology used to detect whether plaintiffs were damaged. (1998)

I was a member of a three-person mediation team that mediated a suit in which the State of California and others were the plaintiffs and Bank of America was the Defendant. The case involved damages to the State from a failure of the Bank to return funds from inactive accounts. (1998)

I submitted an amicus brief to a federal appeals court in reference to a Daubert ruling on the econometric analysis of an expert in a civil suit regarding unfair business practices. The issue in that case was whether the methodology used was a reliable indicator of damage to a competitor from alleged anticompetitive conduct. (2000)

I submitted an expert report and was deposed on behalf of Northpoint Communications in *Northpoint Communications vs. Verizon Communications*. My analysis estimated the loss in the market value of Northpoint as a result of a breach of contract by Verizon. (2001)

I submitted an expert report and was deposed on behalf of DuPont in the Choline Vitamins price- fixing litigation. My analysis estimated damages from the alleged anticompetitive conduct. (2001)

I submitted an expert report and was deposed on behalf of General Electric in *State of New Mexico ex rel, vs. General Electric, et al.* Case number CV 99-1254 BSJ and CV 99-1118 BSJ. The case involved the estimation of stigma damages. I submitted an amicus brief to the United States Supreme Court on this issue. (2002)

I submitted an expert opinion and was deposed and testified on behalf of Visa USA in a class-action litigation regarding pricing of foreign exchange services for credit card users. *Schwartz vs. Visa International, et al*, Case number 822404-4. (2002)

I submitted an expert report and was deposed on behalf of Cellnet of Ohio in *Westside Cellular Inc. dba Cellnet of Ohio vs. New Par et.al.* My analysis estimated damages from alleged illegal pricing of access to a telecommunications network. (2002)

I was retained as the damages expert in a patent infringement case involving reasonable royalties for an electronics invention. The case was dismissed. (2002)

I was retained as the damages expert by AOL in the *Netscape v. Microsoft* antitrust case. This case settled prior to submission of an expert report. (2002-2003)

I was retained as the damages expert by Sun Microsystems in *Sun v. Microsoft* antitrust case. This case settled prior to submission of an expert report. (2003-2004)

I testified in a private arbitration regarding damages from alleged conduct of a participant in an auction for a company. The principals and issues are confidential. (2003)

I submitted a co-authored amicus brief to the Supreme Court in reference to the regulation of interstate wine shipments. (2004)

I submitted an expert report, an affidavit, and was deposed and testified in the Rocky Flats Plant case, a class action against Dow Chemical and Rockwell. On behalf of the defendants, I critiqued the plaintiffs' and defendants damage analysis, and rendered an opinion on their reliability. (1997-2006)

I submitted an expert report and testified at trial in Australia in an antitrust matter on behalf of plaintiff in *Seven v. News Corp.*

I testified at trial on behalf of the defendants in *Pharmaceutical Industry Average Wholesale Price Litigation*, MDL No. 1456, Civil Action: 01-CV-12257-PBS. (2006)

I submitted expert reports on damages, co-authored expert reports on antitrust liability, and provided deposition testimony on behalf of the defendants in *Nitro Distributing, Inc., et al. v. Alticor, Inc., Amway Corporation, and Quixtar, Inc.* Case No. 03-3290-CV-S-RED (2007)

I co-authored a paper on behalf of Qualcomm titled "The Costs of the ITC Downstream Exclusion Order to the U. S. Economy," July 10, 2007, for the Presidential Review Phase of *Certain Baseband Processor Chips and Chipsets, Transmitter and Receiver (Radio) Chips, Power Control Chips, and Products Containing Same, Including Cellular Telephone Handsets*, USITC Inv. No. 337–TA–543.

I submitted an expert report on a patent matter on behalf of the defendants in *Every Penny Counts, Inc. v. Bank of America Corporation and Bank of America, N.A.,* Case No. 2:07-CV-42-FTM-29SPC. (2008)

I testified at trial on behalf of the defendants in *Daniels Sharpsmart v. Tyco International, et al.* (2008)

I submitted an expert report in *Jarra Creek Central Packing Shed Pty Ltd v Amcor Ltd,* Case No. (P)NSD702/2006. (2011)

I submitted an affidavit on behalf of the plaintiffs in *DIRECTV, Inc. and EchoStar Satellite LLC v Loren L. Chumley, Commission of Revenue, State of Tennessee*, Case No. 03-2408-IV (2011)

I submitted an expert report on behalf of the defendants in *Sandra Landwehr v. AOL, Inc.*, Case No. 1:11-cv-01014-CMH-TRJ. (2012)

I was retained as a statistical expert by plaintiffs in the matter of *Syncora Guarantee Inc. v. Countrywide Home Loans, Inc., Countrywide Securities Corp., Countrywide Financial Corp., and Bank of America Corporation*, Supreme Court of the State of New York, County of New York, Index no. 650042/09E, May 6, 2010. This case settled prior to submission of an expert report.

I submitted an expert report in the matter of *United States of America v. Countrywide Financial Corporation et.al.* (12CIV.1422(JSR)), May 7, 2013 and a revised report on June 6, 2013. I testified at deposition in this proceeding on June 11, 2013. I submitted an updated report on August 23, 2013.

I was retained as a consulting expert by defendant in the matter of *In RE: High-Tech Employee Antitrust Litigation,* United States District Court Northern District of California, San Jose Division, Master Docket No. 11-CV-2509-LHK. (2011)

I submitted an expert report (September 2013), a rebuttal report (December 2013), and testified at trial (November 2016) on behalf of plaintiffs in the matter of *U.S. Airways, Inc., v. Sabre Holdings Corporation*, United States District Court Southern District of New York, Civil Action No. 1:11-ev-02725-MGC.

I submitted an expert report (October 6, 2014) *in the Matter of Determination of Rates and Terms for Digital Performance in Sound Recordings and Ephemeral Recordings (Web IV)*, No. 14-CRB-0001-WR.

I submitted an expert report (December 2014), deposition and hearing testimony (March 2015) at a Daubert hearing on the reliability of a proffered structural model of sports content broadcasting in Laumann et al. v. National Hockey League et al., 12-cv-1817 (SAS) and Garber et al. v. Office of the Commissioner of Baseball et al., 12-cv-3704 (SAS), S.D.N.Y.

I submitted an expert report (January 2015) and provided trial testimony (September 2016) on behalf of defendants in the matter of VirnetX Inc, v. Apple, United States District Court, eastern Division of Texas, Tyler Division, Civil Action No.6:11-cv-00563.

I assisted BP in the evaluation of consumer losses due to lost recreational resources on the Gulf of Mexico in the wake of the Deepwater Horizon accident. This matter settled in April 2016 prior to the submission of an expert report.

Appendix B. List of Materials Considered

A. Novartis Events (from Goldberg Report)

1. Kickback events saved in ./Data/1_Model/
    a. inducements.csv
    b. inducements_excluding_pre2010.csv
2. All relevant events saved in .Data/1_Model/
    a. event_summary.csv
    b. brands_at_events.csv
    c. doctor_event_pairs.csv

B. IMS

3. NPI to NOVID crosswalk saved in ./Data/0_General/
    a. [NPCLSV_LIT002169632] 001_20160104 TBC_HCPS.HCP_IDENTIFIER.M01.TXT
4. Claims saved in ./Data/0_General/IMS/
    a. Xponent data
        i. Date Crosswalk: Date_File_Ind.TXT
        ii. XP04_TRANS.txt
        iii. XP05_TRANS.txt
        iv. XP07_TRANS.txt
        v. XP09_TRANS.txt
        vi. XP11_TRANS.txt
    b. Additional production
        i. Date Crosswalk: Reference.xlsx
        ii. Lotrel 1.ACCDB
        iii. Lotrel 2.ACCDB
        iv. Starlix.ACCDB
        v. Valturna.ACCDB
5. IMS Comparator Data saved in ./Data/0_General/IMS Comparator/
    a. DOJ Xponent Deliverable 4-10-17.zip
    b. DOJ Xponent Deliverable 6-26-17.zip

C. Medicare Part D

6. Health Integrity Production saved in ./Data/2_Damages_Medicare/
    a. Note password .TXT files
    b. CD_Medic3057.zip
    c. CD_Medic3058.zip
    d. CD_Medic3059.zip
    e. CD_Medic3060.zip

f. CD_Medic3061.zip
g. CD_Medic3062.zip
h. CD_Medic3063.zip
i. CD_Medic3064.zip
j. CD_Medic3065_1.zip
k. CD_Medic3065_2.zip
l. CD_Medic3066.zip
m. Final_Medic3064_Additional_NDCs-selected.zip
n. Final_Medic3065_Additional_NDCs-selected.zip
o. Final_Medic4041.zip
p. Final_Medic4042.zip
q. Final_Medic4043.zip
r. Final_Medic4044.zip
s. Final_Medic4045.zip
t. Final_Medic4046.zip
u. Final_Medic4048.zip
v. Final_Medic4049.zip
w. Final_Medic4050.zip
x. PASSWORD (3057-3066).txt
y. PASSWORD (all other files).txt
z. R004607_PDE_Doivan_2006.zip
aa. R004630_PDE_Diovan_2007.zip
bb. R004631_PDE_Diovan_2008.zip
cc. R004633_PDE_Diovan_2009.zip
dd. R004634_PDE_Diovan_1112.zip
ee. R004635_PDE_Diovan_2013.zip
ff. R004645_PDE_Diovan_2014.zip
gg. R004646_PDE_Diovan_2015.zip

7. MEDIC Government Impact saved in ./2_Damages_Medicare/MEDIC Government Impact/
    a. MEDIC 4172_2006.xlsx
    b. MEDIC 4172_2007.xlsx
    c. MEDIC 4172_2008.xlsx
    d. MEDIC 4172_2009.xlsx
    e. MEDIC 4172_2010.xlsx
    f. MEDIC 4172_2011.xlsx
    g. MEDIC 4172_2012.xlsx
    h. MEDIC 4172_2013.xlsx
    i. MEDIC 4172_2014.xlsx
    j. MEDIC 4172_2015.xlsx

D. MEDICAID

8. Raw state productions saved in .Data/2_Damages_Medicaid/Input/
    1. AK_FFS_Claims_Novartis_201611_subm.xlsx
    2. AL_Novartis_ Bilotta_FFS.txt
    3. AR_Novartis_Bilotta_FFS.txt
    4. AZ__Novartis_Bilotta_FFS.txt
    5. AZ__Novartis_Bilotta_MCO.txt
    6. CA_Novartis_Bilotta_ENC.txt
    7. CA_Novartis_Bilotta_FFS1.txt
    8. CA_Novartis_Bilotta_FFS2.txt
    9. CO Novartis Bilotta FFS.csv
    10. CT_Novartis_Bilotta_ENC.txt
    11. CT_Novartis_Bilotta_FFS.txt
    12. DC_Novartis_Bilotta_FFS Query.xlsx
    13. DC_Novartis_Bilotta_MCO Query.xlsx
    14. DE_Novartis_Bilotta_FFS.txt
    15. FL_NovartisENCA.txt
    16. FL_NovartisENCB.txt
    17. FL_NovartisFFSA.txt
    18. FL_NovartisFFSB.txt
    19. GA_Novartis_Bilotta_ENC.csv
    20. GA_Novartis_Bilotta_FFS.txt
    21. HI_Novartis_Bilotta_FFS.txt
    22. IA-Novartis_Bilotta_FFS.txt
    23. ID_ Novartis Bilotta Data Response 09142015.txt
    24. IL_Novartis_Bilotta_ENC.txt
    25. IL_Novartis_Bilotta_FFS.txt
    26. IN_Novartis_Bilotta_ENC.txt
    27. IN_Novartis_Bilotta_FFS.txt
    28. KS_Novartis_Bilotta_ENC.txt
    29. KS_Novartis_Bilotta_FFS.txt
    30. KY_Novartis_Bilotta_ENC.txt
    31. KY_Novartis_Bilotta_FFS.txt
    32. LA MQMSR Report 390 Novartis Bilotta Data Request.csv
    33. MA_Novartis_Bilotta_ALLFFS (2).txt
    34. MA_Novartis_Bilotta_ENC.txt
    35. MD_Novartis_Bilotta_ENC.txt
    36. MD_Novartis_Bilotta_FFS.txt
    37. ME_Novartis_Bilotta_FFS.csv
    38. MI_Novartis_Bilotta_ENC.txt
    39. MI_Novartis_Bilotta_FFS.txt
    40. MN_Novartis_Bilotta_ENC.csv

41. MN_Novartis_Bilotta_FFS.csv
42. MO_Novartis_Bilotta_FFS .txt
43. MS_NOVARTIS_BILOTTA_ENC.txt
44. MS_NOVARTIS_BILOTTA_FFS.txt
45. MT_1-1-2002 to 11-30-2011 data tilde - Copy.txt
46. MT_1-1-2010 to 11-30-2011 data tilde - Copy.txt
47. ND_Novartis Data Request Case# 12-10-01 (2).txt
48. ND_Novartis Data Request Case# 12-10-01.txt
49. NE_Novartis_Bilotta_FFS.txt
50. NH_Bilotta v Novartis.txt
51. NJ Novartis v Bilotta - # 1 - ENC - 6 Drugs - NDC\''s - 01_01_2002 - 12_31_2006.txt
52. NJ Novartis v Bilotta - # 1 - ENC - 6 Drugs - NDC\''s - 01_01_2007 - 11_30_2011.txt
53. NJ Novartis v Bilotta - # 2 - ENC - 3 Drugs - NDC\''s - 01_01_2010 - 11_30_2011.txt
54. NJ Novartis v Bilotta - # 2 - FFS - 3 Drugs - NDC\''s - 01_01_2010 - 11_30_2011.txt
55. NJ Novartis v Bilotta Question # 1 - FFS - 6 Drugs - NDC\''s - 01_01_2005 - 12_31_2006.txt
56. NJ Novartis v Bilotta Question # 1 - FFS - 6 Drugs - NDC\''s - 01_01_2002 - 12_31_2004.txt
57. NJ Novartis v Bilotta Question # 1 - FFS - 6 Drugs - NDC\''s - 01_01_2007 - 12-31-2009.txt
58. NJ Novartis v Bilotta Question # 1 - FFS - 6 Drugs - NDC\''s - 01_01_2010 - 11_30_2011.txt
59. NM_FINAL_ENC_DW_MF.txt
60. NM_FINAL_FFS_DW_MF.txt
61. NM_Novartis_Bilotta_ENC.txt
62. NM_Novartis_Bilotta_FFS.txt
63. NV_2015-09-09_NV Response Sheet_CLS.txt
64. NY_CR55950_DMART_2002_2005_C_NDC_MFCU_TBG.CSV
65. NY_CR55950_DMART_2002_2005_E_CRN_MFCU.csv
66. NY_CR55950_MDW_2002_2011_C_NDC_MFCU.csv
67. NY_CR55950_MDW_2002_2011_E_TCN_MFCU_TBG.csv
68. OH_Novartis_Bilotta_ENC.txt
69. OH_Novartis_Bilotta_FFS.txt
70. OK_Novartis_Bilotta_ENC.csv
71. OK_Novartis_Bilotta_FFS.csv
72. OR_Novartis_Bilotta_ENC.txt
73. OR_Novartis_Bilotta_FFS.txt
74. PA_FFS_Export.txt
75. PA_MCO_Export.txt

76. RI_Novartis_Bilotta_ENC.txt
77. RI_Novartis_Bilotta_FFS.txt
78. SC_Novartis_Bilotta_ENC.txt
79. SC_Novartis_Bilotta_FFS.txt
80. SD_Novartis_Bilotta_FFS.txt
81. TN_Novartis__Bilotta_FFS.xlsx
82. TX_Novartis_Bilotta_FFS_01012002_12312005.txt
83. TX_Novartis_Bilotta_FFS_20060101_20111130.txt
84. UT_Novartis_Bilotta_FFS.txt
85. VA_Novartis_Bilotta_ENC.txt
86. VA_Novartis_Bilotta_FFS.txt
87. VT_Novartis_Bilotta_FFS.txt
88. WA_Novartis_Bilotta_ENC.txt
89. WA_Novartis_Bilotta_FFS.txt
90. WI_Novartis_Bilotta_FFS.txt
91. WV_Novartis_Bilotta_FFS_Results #1 2002-2004.xlsx
92. WV_Novartis_Bilotta_FFS_Results #1 2005-2011.xlsx
93. WV_Novartis_Bilotta_FFS_Results #2.xlsx
94. WY Novartis Bilotta FFS.txt

2. Documentation saved in .Data/2_Damages_Medicaid/Input/Documentation/
    1. MS_claim_status_codes.txt
    2. NE Field Definitions for Bilotta National Req 08272015.docx
    3. NV_2015-09-09_NV Response Sheet_CLS.docx
    4. OH_Field Definitions for Bilotta National Req 08272015.docx
    5. OR_Field Definitions for Bilotta National Req 08272015_ENC.docx
    6. OR_Field Definitions for Bilotta National Req 08272015_FFS.docx
    7. RI Novartis Data Request Additional Info.pdf
    8. SD_Field Definitions for Bilotta National Req 08272015.docx
    9. WA_Litigating_States_Field_Definitions.docx
    10. AL_DATA FIELDS CROSS REFERENCE.xlsx
    11. AL_Novartis Bilotta Data Request Final 08272015.docx
    12. DE_Field Definitions for Bilotta National Req 08272015.docx
    13. KY_Field Definitions for Bilotta National Req 08272015.docx
    14. MI_Field Definitions for Bilotta National Req 08272015-Michigan.docx
    15. MS_bse_amt_src_cd_desc.xlsx
3. Federal Medical Assistance Percentages saved in .Data/2_Damages_Medicaid/Input/
    1. fmap_input.xlsx

E. TRICARE

9. Mail order, MTF and retail in ./2_Damages/Tricare/Input/
    a. MTF.accdb
    b. Novartis_MailOrder_2002-2004.accdb
    c. Retail 02-04.accdb

d. Retail 05a.accdb
e. Retail 05b.accdb
f. Retail 06a.accdb
g. Retail 06b.accdb
h. Retail 07a.accdb
i. Retail 07b.accdb
j. Retail 08a.accdb
k. Retail 08b.accdb
l. Retail 09a.accdb
m. Retail 09b.accdb
n. Retail 10a.accdb
o. Retail 10b.accdb
p. Retail 11.accdb

F. OTHER

10. DEA, UPIN, and other IDs to NPI in ./Data/0_General/
    a. 2015.12.9_Master doctor list with prescriber IDs etc.xlsx
    b. DEA NPI UPIN Match.xlsx
    c. dea-npi_jan.xlsx
    d. priddy2.xlsx
    e. Priddy009_08_2_2013.xlsx
    f. Priddy009_20-Aug-2013.xlsx
    g. Priddy009_22-Aug-2013.xlsx
    h. Priddy009_I2_Medicare_SumStats_4Feb2013.xlsx
    i. Priddy009_Medicaid_Phase1_revised_SumStats_14Jan2013.xlsx
    j. Priddy009_Medicaid_Phase2_SumStats_14Jan2013.xlsx
    k. Priddy009_Medicaid_SumStats_23Nov2012.xlsx
    l. Priddy009_Medicare_SumStats_19Nov2012.xlsx
    m. tricare_dea_to_npi_2017-03-02.xlsx
11. NDC to drug name in ./Data/0_General/
    a. ndc_codes_2017-02-27.csv
12. CMS. Data Compendium 2010 Edition, Table VI.8. Accessed August 9, 2017. https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/DataCompendium/14_2010_Data_Compendium.html.
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14. National Center for Health Statistics (US). "Health, United States, 2015: With Special Feature on Racial and Ethnic Health Disparities." Hyattsville, MD. May 2016. Accessed June 16, 2017. https://www.ncbi.nlm.nih.gov/books/NBK367640/pdf/Bookshelf_NBK367640.pdf.
15. Cameron, A. C. and P. K. Trivedi. "Basic Count Regression." In *Regression Analysis of Count Data.* Econometric Society Monograph No. 30. Cambridge University Press, 1998.
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b. Third Amended False Claims Act Complaint. *United States of America vs. Novartis Pharmaceuticals Corp.*, No. 11-cv-0071-PGG. July 10, 2013.
c. Expert Report of Richard Goldberg, in the matter of the *United States v Novartis Pharmaceutical Corporation*, Case No., 11 Civ. 0071 (PGG), August 14, 2017.

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c. Generic Cozaar Availability. Accessed August 14, 2017. https://www.drugs.com/availability/generic-cozaar.html.
d. Generic Hyzaar Availability. Accessed August 14, 2017. https://www.drugs.com/availability/generic-hyzaar.html.
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Appendix C. Data Description

This appendix details how I prepared the prescriptions datasets for my analysis. In addition, I describe the construction of the NPI crosswalk, *i.e.*, table that maps physician identifiers to NPI codes.

I. IMS Data

I received IMS Xponent data from Novartis's production.

For Lotrel, Starlix, and Valturna, the raw data provides counts of new and total (new plus refills) prescriptions by drug name, dosage level, doctor (NOVID), and month. For the remaining drugs, I have drug name, doctor, and month but do not know prescription counts by dosage level. Thus, for consistency in my analysis across the drugs at issue, I summed prescription counts across dosage levels for Lotrel, Starlix, and Valturna.[1]

II. Medicaid

I received prescriptions data for Medicaid from 49 states and Washington, D.C.; North Carolina did not provide information. The list of states (and DC) is:

AK	GA	MD	NJ	SD
AL	HI	ME	NM	TN
AR	IA	MI	NV	TX
AZ	ID	MN	NY	UT
CA	IL	MO	OH	VA
CO	IN	MS	OK	VT
CT	KS	MT	OR	WA
DC	KY	ND	PA	WI
DE	LA	NE	RI	WV
FL	MA	NH	SC	WY

A. Data Preparation

Each individual state has its own distinct datasets for prescriptions. For each state dataset, I extracted the following fields when available: state, claim type, prescriber ID, patient ID,

[1] I estimate and predict based on data on number of fills, of any dosage level and days. When I calculate damages, I use the actual mix and attendant government cost is used for prescriptions by a doctor in a given month.

dispensed date, refill code, National Drug Code, and amount paid. I appended the individual state datasets to create a consolidated Medicaid dataset.

I use "dispensed date" as the date of the prescription and "National Drug Code" to identify the drug name.

Claims are classified as Managed Care ("MC") or Fee-For-Service ("FFS"). MC claims include claim types "COHS" and "ENC." FFS claims include claim type "D."

I exclude observations if any of the following conditions are met:

- The observation is missing prescriber ID.
- Amount paid is missing or 0.
- Refill code is missing.
- Claim status code is void or canceled.
- Observations that do not appear to have an NPI after merging in the NPI crosswalk.[2]
    - I determine a prescriber ID to be an NPI if it is an all numeric 10-character ID.
    - Before assigning prescriber ID to NPI using the NPI crosswalk, I concatenate patient ID with state to create a unique identifier as different states may share overlapping but distinct patient IDs.
- Observations that are duplicates with respect to patient ID, prescriber ID, National Drug Code, dispensed date, refill code, and amount paid.

"Net amount paid" is calculated by summing claims with the same patient ID, prescriber ID, National Drug Code, dispensed date, and refill code. This step accounts for reversals.

I separated the amounts paid by the federal and state governments using Federal Medical Assistant Percentages ("FMAP").[3]

B. MEDICAID DAMAGES

A "prescription chain" is defined as a new prescription or reauthorization (*i.e.*, a claim with refill code of 0 or equivalent) and subsequent refills (*i.e.*, a claim with refill code greater than 0 or equivalent) until the next new prescription/reauthorization or the end of the period. Refills must

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[2] First, I merged NPIs for prescribers with non-NPI IDs using the ID-NPI crosswalk. Non-NPI IDs combine prescriber ID with state to create a unique identifier in case state prescriber IDs overlapped by chance. Then, I dropped observations if the reported prescriber ID is not a 10-digit numerical code (i.e., not an NPI). I ran these prescriber IDs (NPIs) through the NPI-NOVID crosswalk to get their NOVIDs.

[3] https://aspe.hhs.gov/federal-medical-assistance-percentages-or-federal-financial-participation-state-assistance-expenditures (date accessed: 8/13/2017); https://www.gpo.gov/fdsys/pkg/FR-2003-06-17/pdf/03-15274.pdf (date accessed: 8/4/2017).

have the same doctor, patient, and drug as the original new or reauthorized prescription. A refill can be linked to at most one new or reauthorized prescription, which is determined as the most recent prior new or reauthorized prescription. Refills that cannot be linked to a new or reauthorized prescription are omitted from the damages calculation.

For a given prescription chain, the "original prescription date" is the date of the new or reauthorized prescription. All fills for the prescription claim have the same original prescription date.

The causality model indicates, based on the available data and the kickback criteria, whether, in a given month, a doctor wrote more new prescriptions in the "as is" world with kickbacks than the "but for" world without kickbacks. If his/her expected number of new prescriptions is larger in the "as is" world than the "but for" world, then the doctor is considered to have been influenced by kickbacks.

To calculate damages, I aggregate the total number of new or reauthorized prescriptions that were written in months when the doctor was influenced by kickbacks and the refills belonging to the same prescription chains of those new or reauthorized prescriptions.

For FFS and MC prescriptions, I break out damages owed to the United States and to the states (plus D.C.) that are listed as Plaintiffs on the Amended Complaint.[4]

III. Medicare Part D

A. Data Preparation

I use final action Medicare Part D Prescription Drug Events provided by Health Integrity, a contractor to CMS.[5]

For my analysis, I focus on the following data fields: patient ID (PDE_HICN); prescriber ID (Prescriber_ID_Crosswalked), NDC (Drug_MDDB_NDC_code), service date (Date_Date_of_Service), refill code (fill_no), and ingredient cost (PDE_Ingredient_Cost_AMT). Service date is used as the date of the claim, and drug name is based on the National Drug Code.

I exclude observations that meet at least one of the following conditions:

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[4] These states are California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Oklahoma, Rhode Island, Tennessee, Texas, Virginia, and Wisconsin as well as the District of Columbia (Amended Complaint, August 26, 2013).

[5] See list of MEDIC datasets from Health Integrity Production in Appendix B.

- Observations that are duplicates based on all six fields named above.
- Observations where the NDC is missing or is "MINOXIDIL."
- Observations that do not have an NPI.
    - If the prescriber ID is not an NPI code, I used the NPI crosswalk and, if available, assigned the doctor's NPI code to the record.
    - I define a prescriber ID as an NPI if it is an all numeric 10-character ID.

B. MEDICARE PART D DAMAGES

The aggregation approach by prescription chain for prescriptions written when the doctor was influenced by kickbacks is the same for Medicare Part D as for Medicaid.

Whereas the paid amount by the government is available in the Medicaid prescriptions data, I use government impact numbers developed by MEDIC to calculate the cost per prescription to the United States.[6] I prepared MEDIC's government impact data as follows:

- For 2014, prescriber IDs ("PRESCRIBER_ID_CROSSWALKED") are missing the last two digits. To correct for this, I use prescriber IDs and prescriber names ("PRESCRIBER_COMPANY_NAME") of non-2014 years to infer the last two digits for 2014 prescriber IDs.
    - I create a version of prescriber NPI ("Sliced Prescription ID") omitting the last two digits for non-2014 years.
    - By sliced prescription ID and prescriber name, I merge in a complete prescriber ID for 2014.
- I computed the average government impact per prescription for each doctor, year, and drug by dividing annual government impact ("GOVERNMENT IMPACT") by annual prescription count ("NO_OF_RECS"). For each doctor and drug, prescriptions across all months in the calendar have the same government impact per prescription.[7]

IV. TRICARE

A. DATA PREPARATION

I received 2002-2011 prescriptions data for TRICARE beneficiaries from the Defense Health Agency in 16 access databases for Retail, Mail Order, and Military Treatment Facilities ("MTF").

Key data fields in the TRICARE prescriptions data include:

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[6] See MEDIC files listed in Appendix B.

[7] I estimated the shifted Poisson model on monthly data. The reason for using the average government impact per prescription of the calendar year is that MEDIC calculated government impact by doctor and drug on an annual basis.

- Dispensed date ("Date Dispensed") as date of claim;
- National Drug Code ("NDC") to determine the drug;
- Submitted amount due ("Submitted Amount Due") as cost per prescription to the United States.

I exclude observations if any of the following conditions are met:

- Observations for which the claim status ("Claim Status") is not "Paid."
- Observations that do not have Novartis listed as the manufacturer.
- Observations that do not have a patient ID ("DEERS ID").
- Observations for which I am unable to match the prescriber ID to an NPI code.
    - I merge prescriber ID ("Provider ID") to NPI using the NPI Crosswalk.
    - I determine a prescriber ID to be an NPI if it is an all numeric 10-character ID.
- Observations that are duplicates with respect to patient ID, prescriber ID, National Drug Code, dispensed date, refill code ("New Refill Code"), and submitted amount due.

B. TRICARE DAMAGES

The approach to calculating damages for TRICARE based on prescription chains is analogous to that which I have described for Medicaid and Medicare Part D. Like Medicaid, the cost per prescription to the government is available in the data.

V. NPI and NOVID Crosswalks

I use the following files, sourced from the STARs database, to create the NPI crosswalk that maps physician identifiers (DEA, UPIN, Provider ID, and Medicaid ID) to NPI codes:

1. '2015.12.9_Master doctor list with prescriber IDs etc.xlsx'
2. 'DEA NPI UPIN Match.xlsx'
3. dea-npi_jan.xlsx
4. Priddy009_08_2_2013.xlsx
5. Priddy009_20-Aug-2013.xlsx
6. Priddy009_22-Aug-2013.xlsx
7. Priddy009_I2_Medicare_SumStats_4Feb2013.xlsx
8. Priddy009_Medicaid_Phase1_revised_SumStats_14Jan2013.xlsx
9. Priddy009_Medicaid_Phase2_SumStats_14Jan2013.xlsx
10. Priddy009_Medicaid_SumStats_23Nov2012.xlsx
11. Priddy009_Medicare_SumStats_19Nov2012.xlsx
12. priddy2.xlsx
13. tricare_dea_to_npi_2017-03-02.xlsx

When there exists conflicting ID to NPI matches (*i.e.*, one ID merges to multiple NPIs), I exclude all conflicting ID-NPI matches.

I exclude any all numeric 10-character IDs because such IDs may be conflated with valid NPIs.

Novartis produced a crosswalk that maps NPI codes to NOVID; see NPCLSV_LIT002169632.

For all ID-to-NPI and NPI-to-NOVID matching, I treat IDs and NPIs as case-insensitive and ignore non-alphanumeric characters (*e.g.*, "0001" and "000-1" would be equivalent).

Appendix D.1. Monthly Average New Prescriptions per Doctor by Doctor Participation in Novartis Events using IMS Data

Figure 1: Monthly New Prescriptions per Doctor by Year – Diovan (IMS Data)

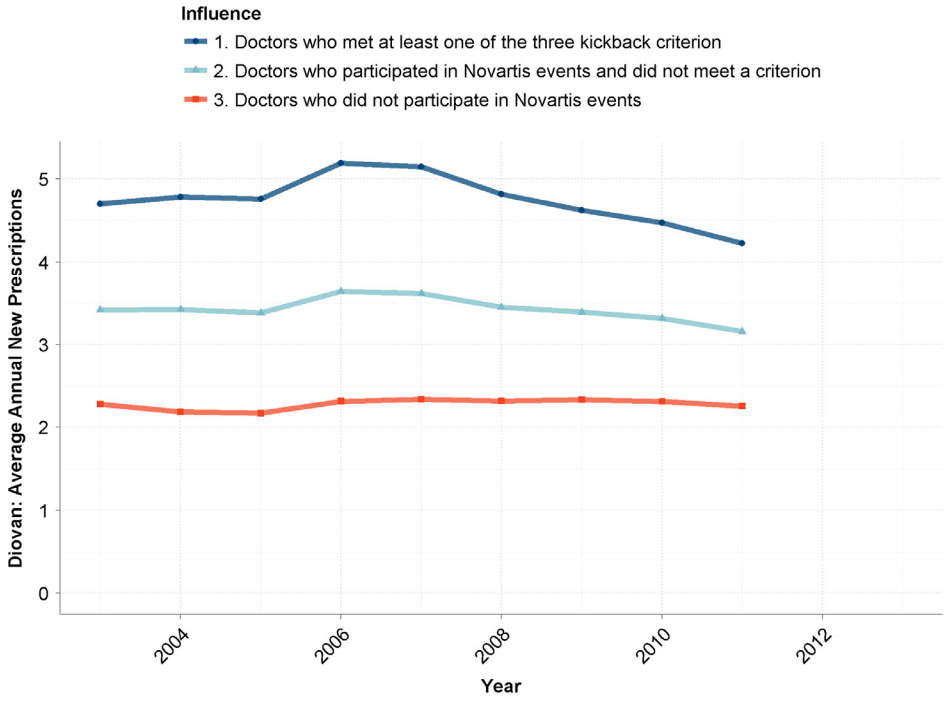


Figure 2: Monthly New Prescriptions per Doctor by Year – Diovan HCT (IMS Data)

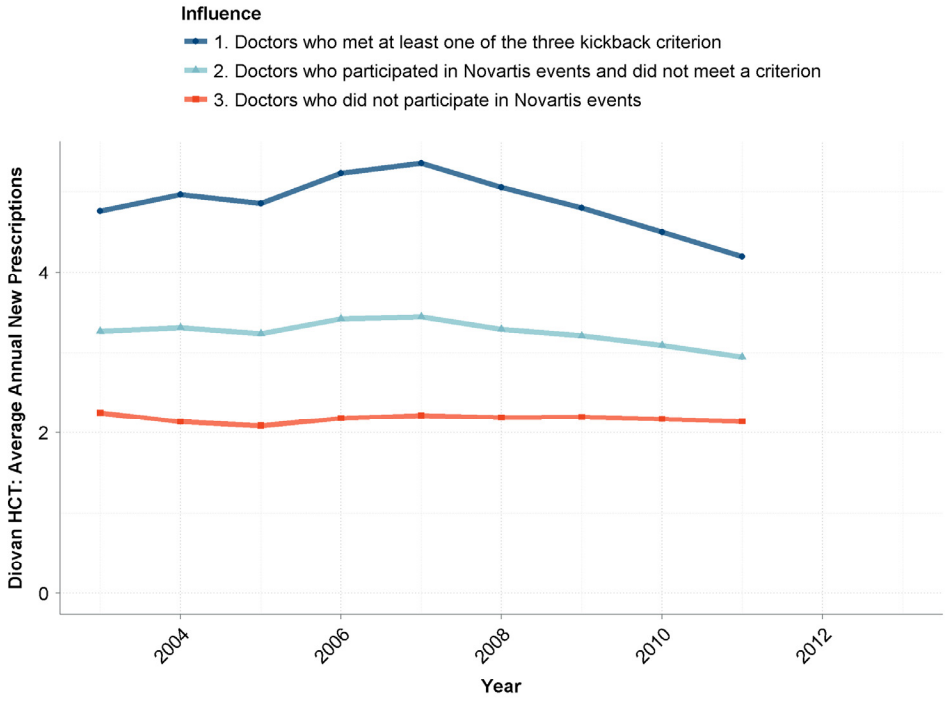


Figure 3: Monthly New Prescriptions per Doctor by Year – Exforge (IMS Data)

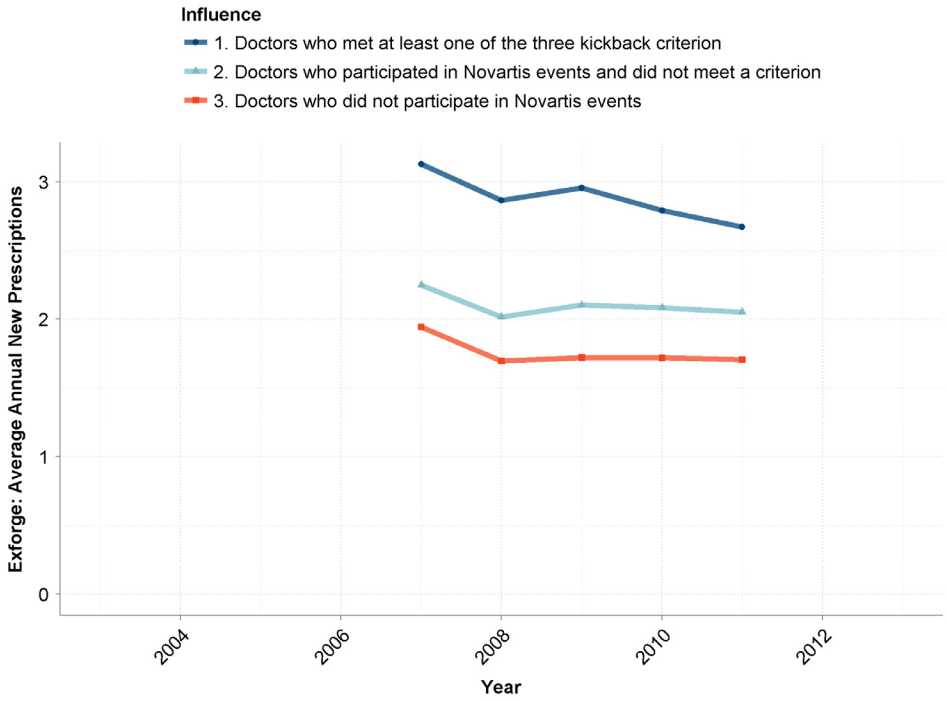


Figure 4: Monthly New Prescriptions per Doctor by Year – Exforge HCT (IMS Data)

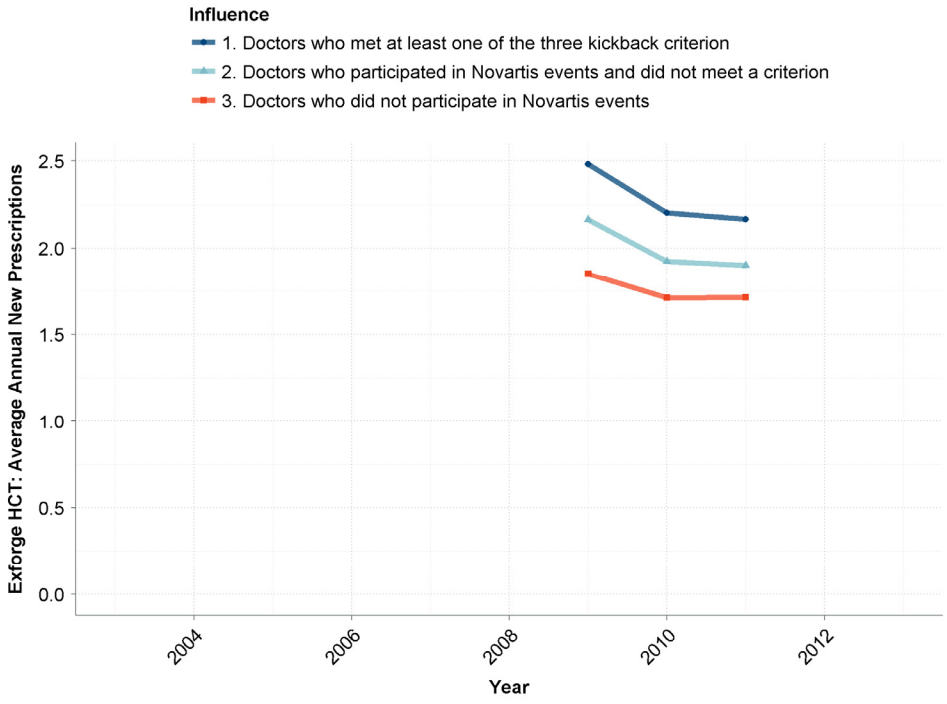


Figure 5: Monthly New Prescriptions per Doctor by Year – Lotrel (IMS Data)

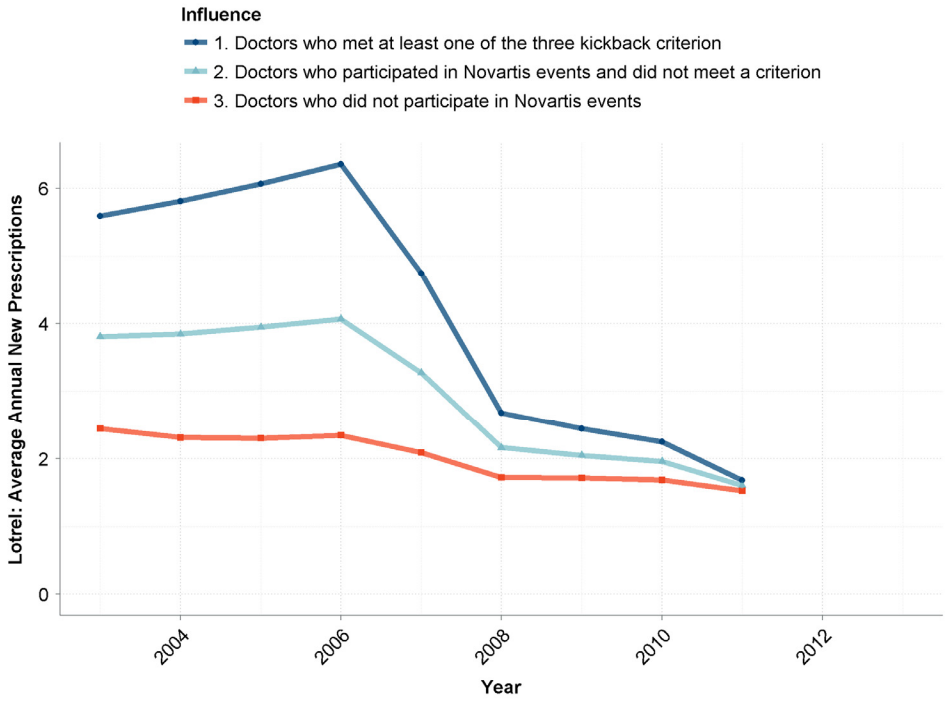


Figure 6: Monthly New Prescriptions per Doctor by Year – Starlix (IMS Data)

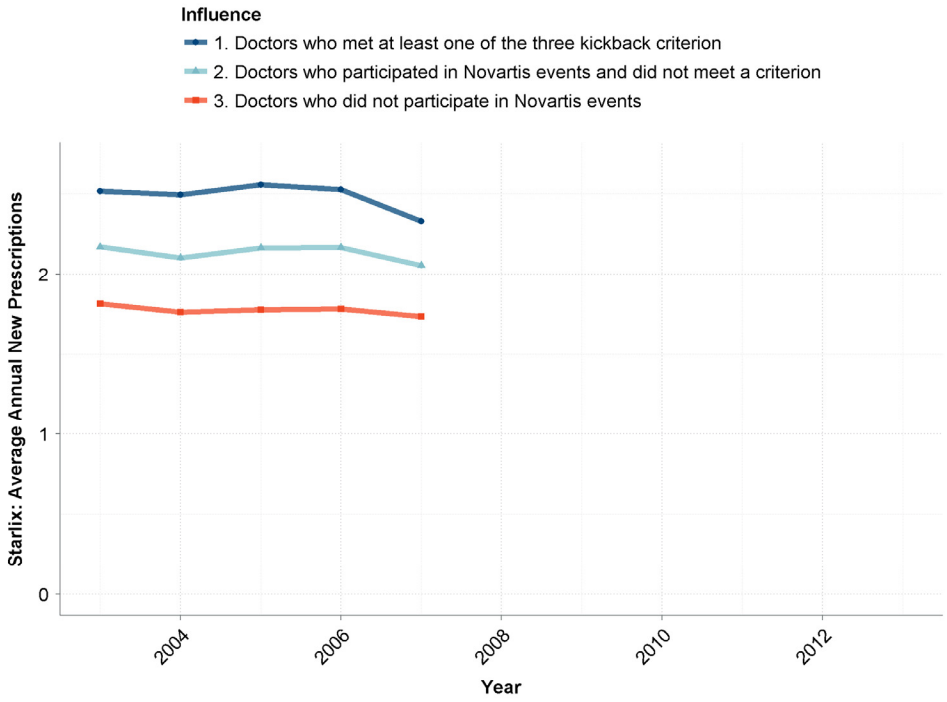


Figure 7: Monthly New Prescriptions per Doctor by Year – Tekamlo (IMS Data)

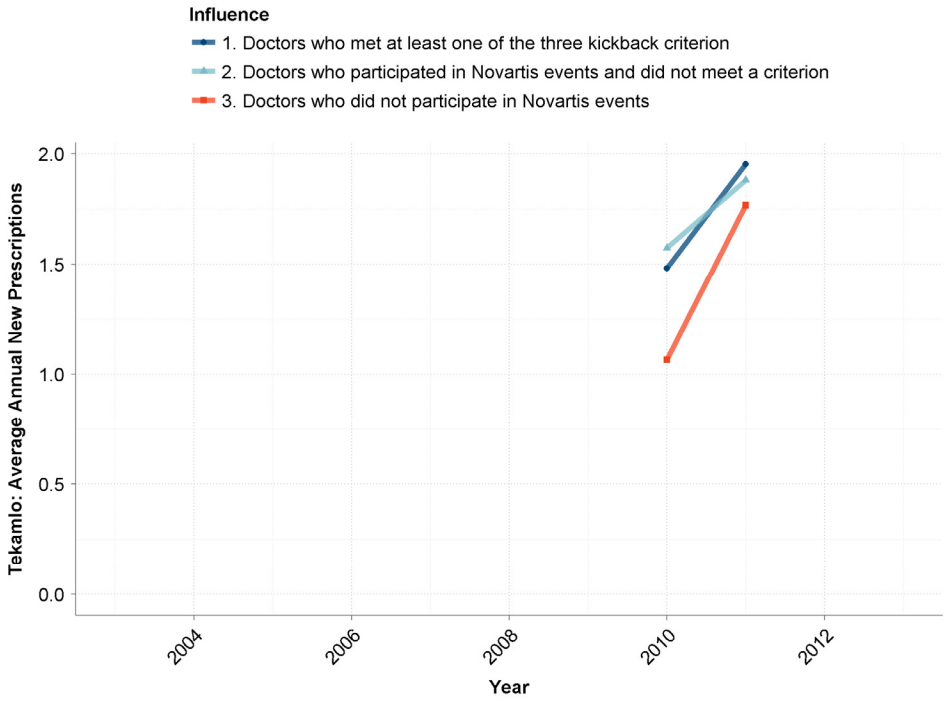


Figure 8: Monthly New Prescriptions per Doctor by Year – Tekturna (IMS Data)

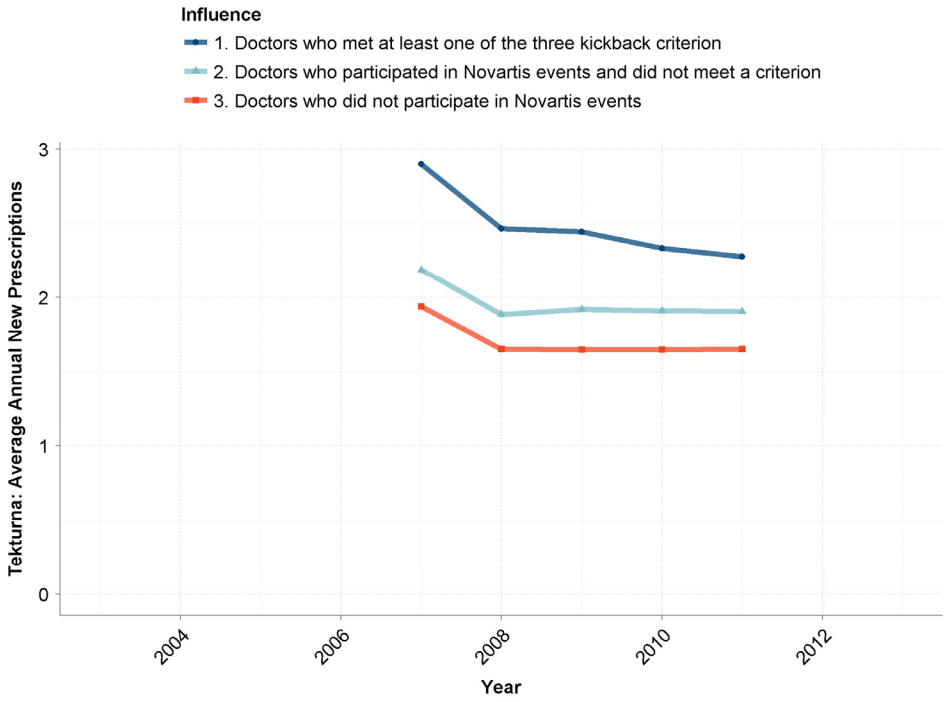


Figure 9: Monthly New Prescriptions per Doctor by Year – Tekturna HCT (IMS Data)

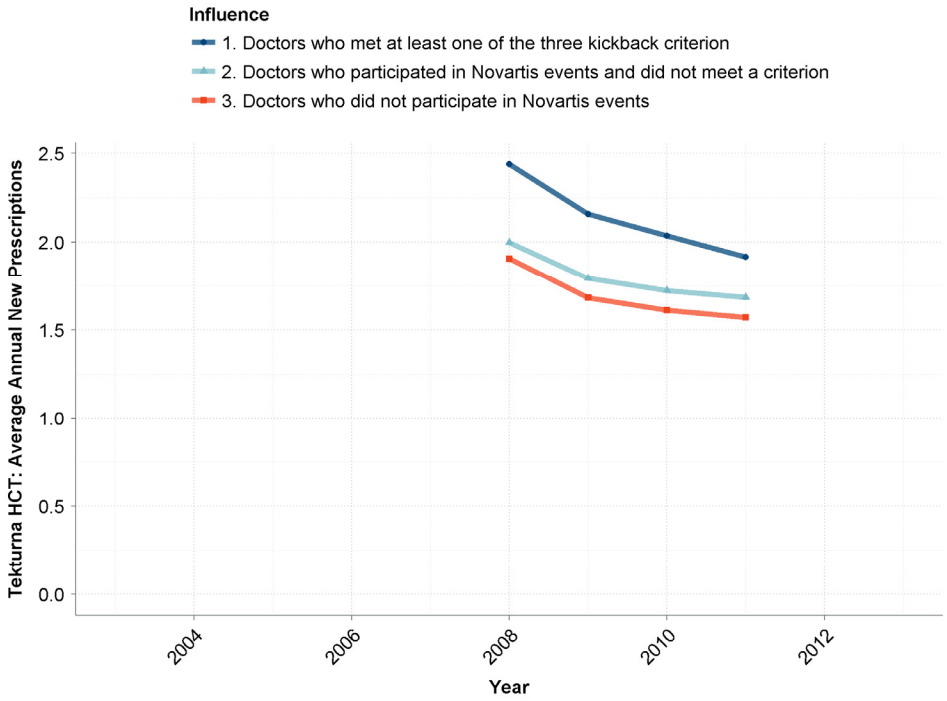
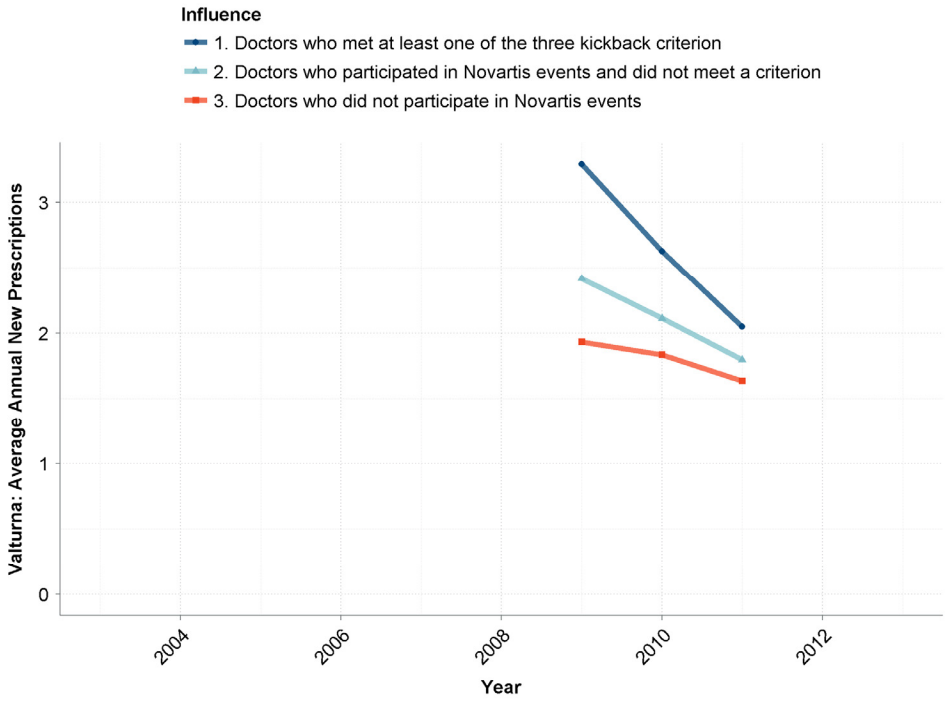


Figure 10: Monthly New Prescriptions per Doctor by Year – Valturna (IMS Data)



Appendix D.2. Monthly Average Total Prescriptions per Doctor by Doctor Participation in Novartis Events using IMS Data

Figure 11: Monthly Total Prescriptions per Doctor by Year – Diovan (IMS Data)

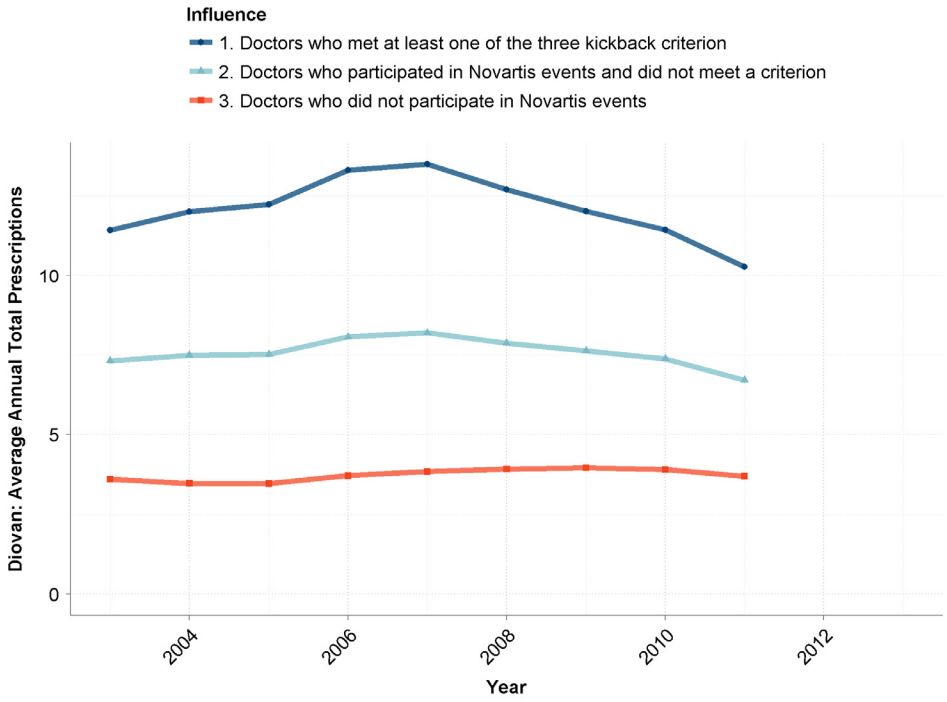


Figure 12: Monthly Total Prescriptions per Doctor by Year – Diovan HCT (IMS Data)

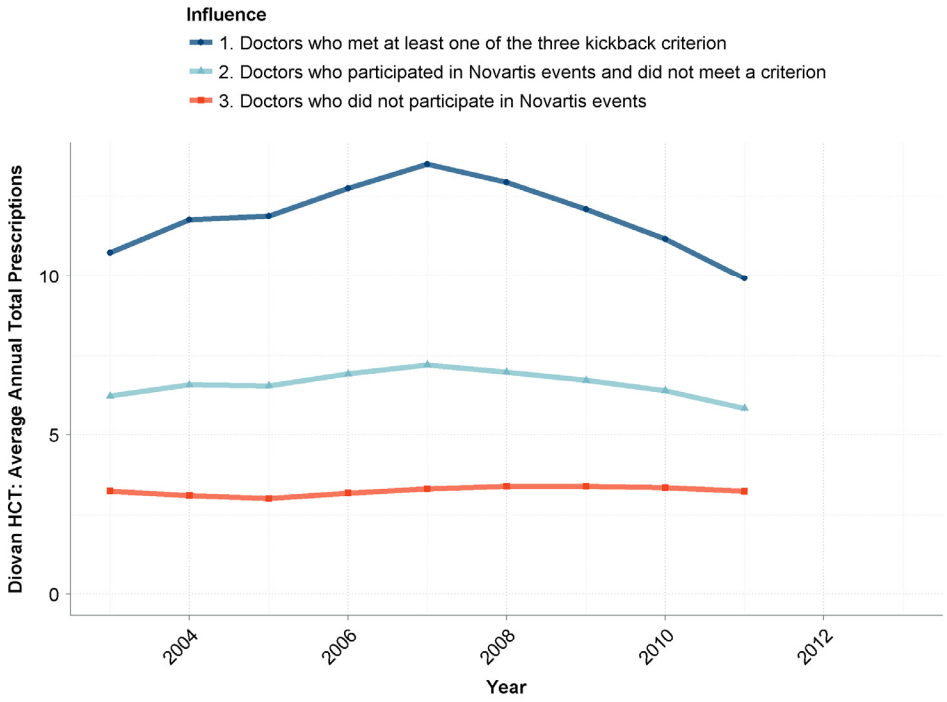


Figure 13: Monthly Total Prescriptions per Doctor by Year – Exforge (IMS Data)

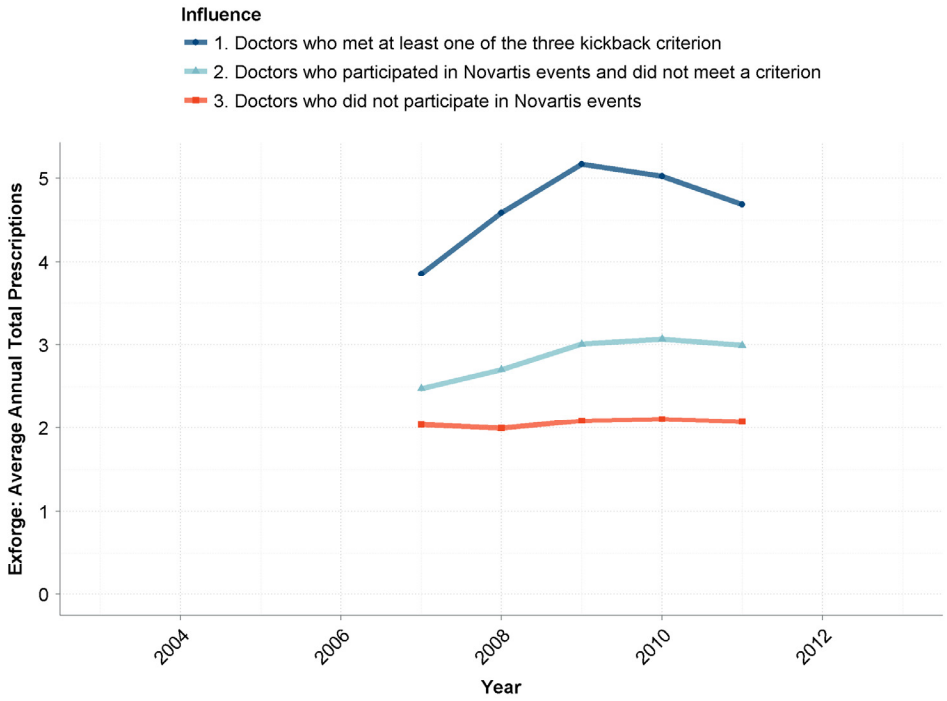


Figure 14: Monthly Total Prescriptions per Doctor by Year – Exforge HCT (IMS Data)

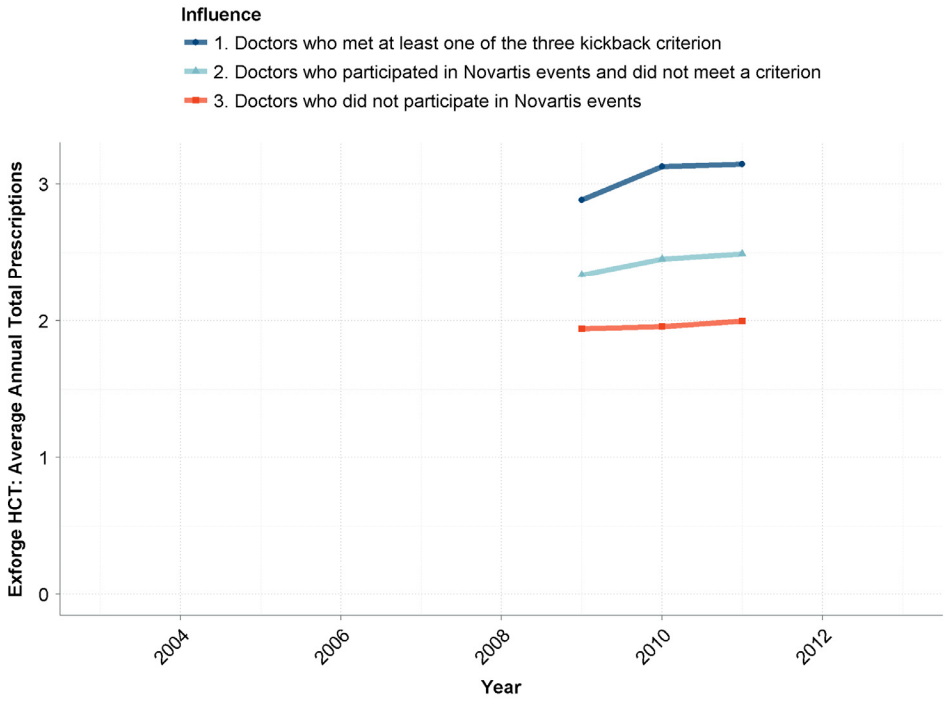


Figure 15: Monthly Total Prescriptions per Doctor by Year – Lotrel (IMS Data)

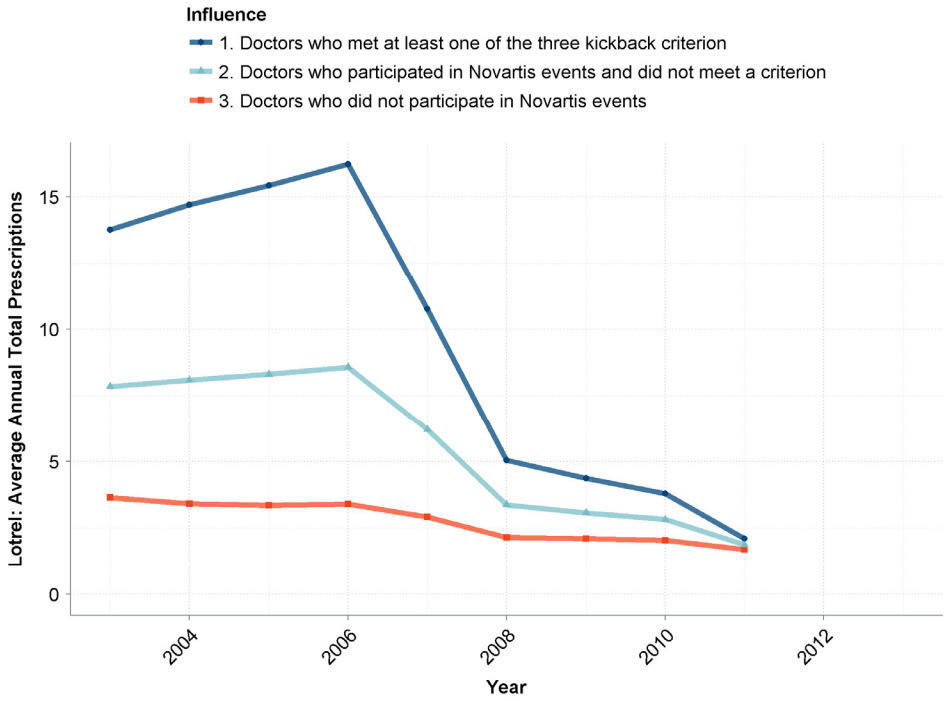


Figure 16: Monthly Total Prescriptions per Doctor by Year – Starlix (IMS Data)

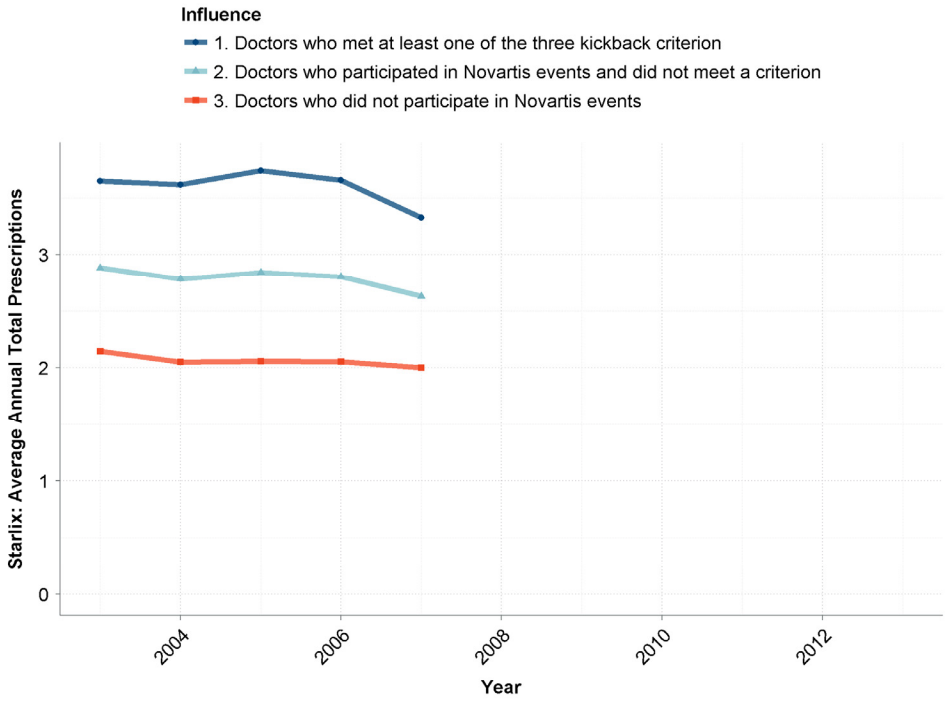


Figure 17: Monthly Total Prescriptions per Doctor by Year – Tekamlo (IMS Data)

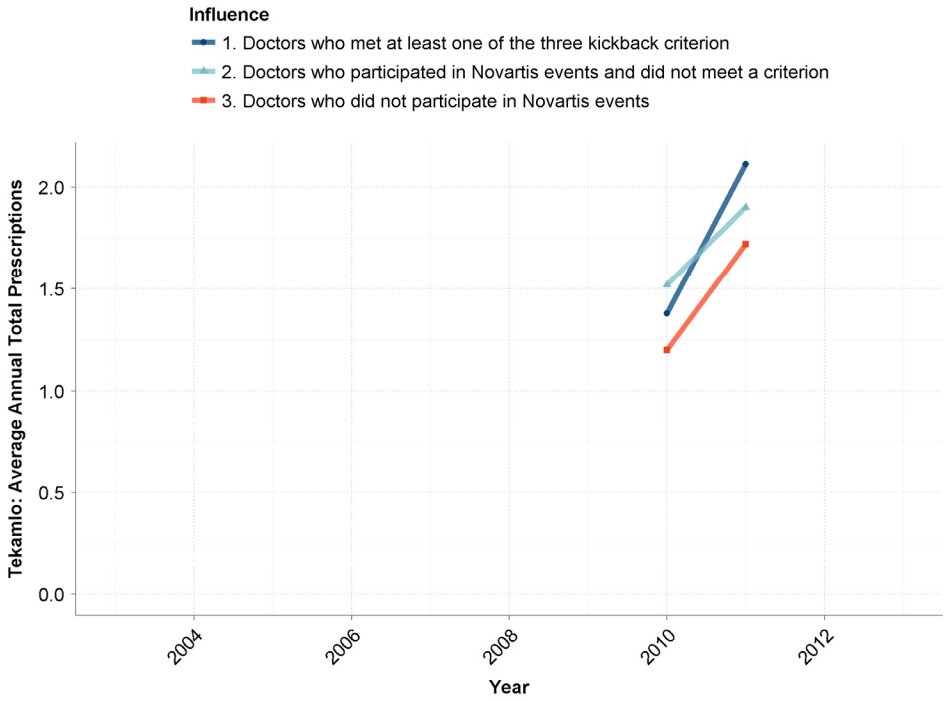


Figure 18: Monthly Total Prescriptions per Doctor by Year – Tekturna (IMS Data)

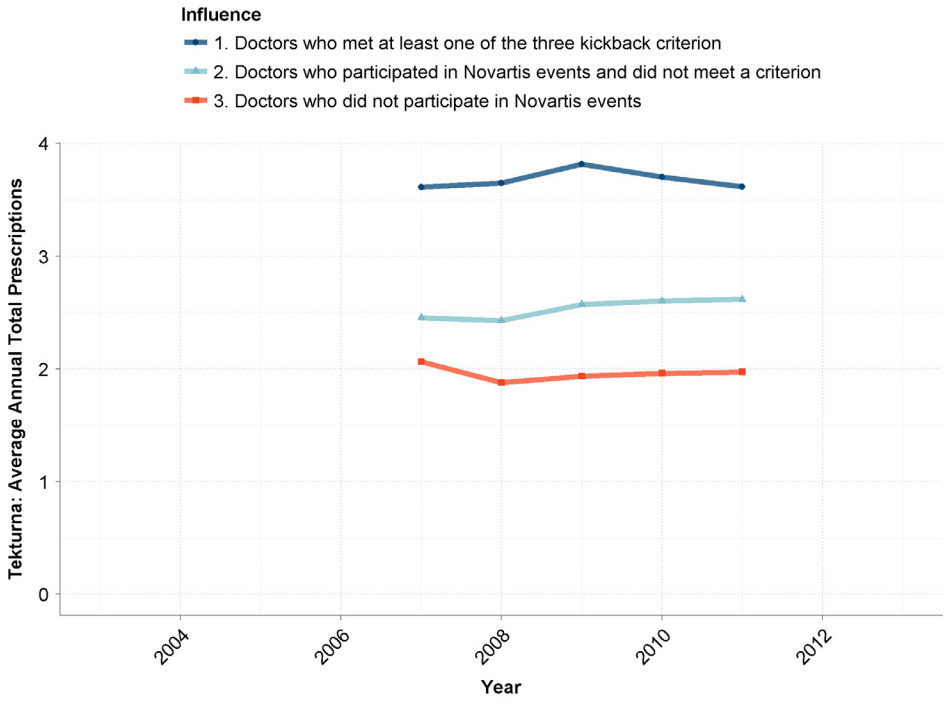


Figure 19: Monthly Total Prescriptions per Doctor by Year – Tekturna HCT (IMS Data)

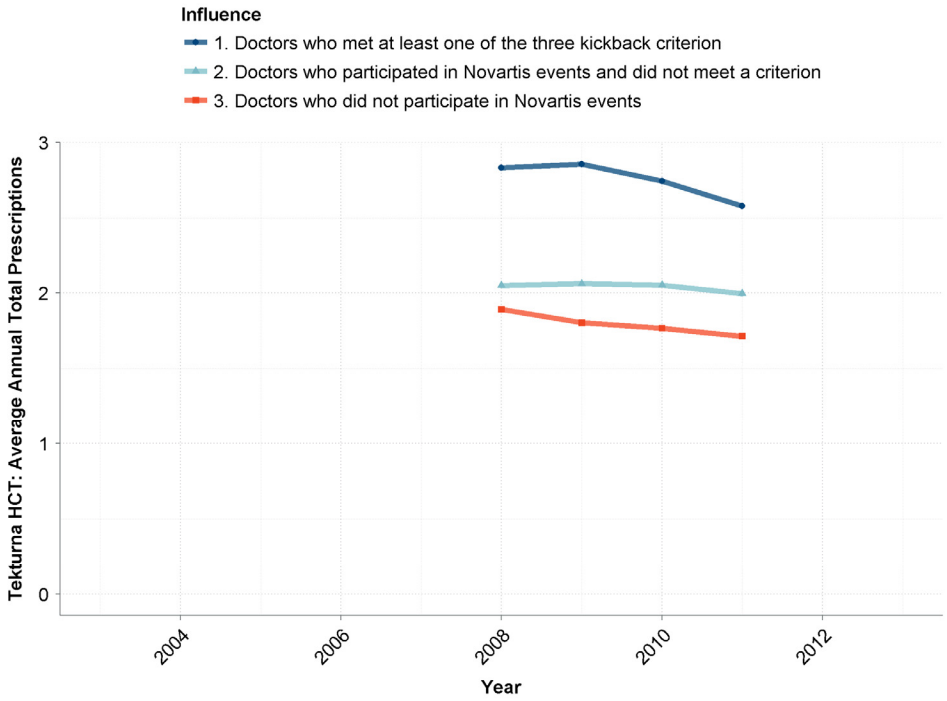
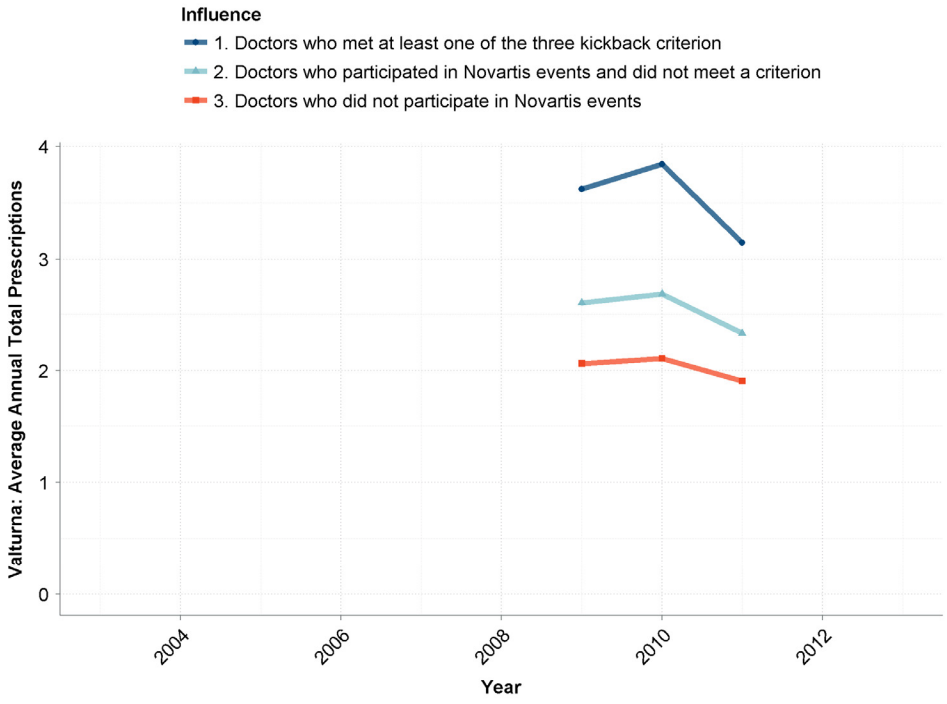


Figure 20: Monthly Total Prescriptions per Doctor by Year – Valturna (IMS Data)



Appendix E. Model Results

	Diovan	Diovan HCT	Exforge	Exforge HCT	Starlix	Tekturna	Tekturna HCT	Tekamlo	Valturna	Lotrel	
										Before 4/2007	After 5/2007
# Kickbacks in Month T-1	0.02319	0.01905	0.03599	-0.03526	0.00405	0.03751	-0.00888	-0.09591	0.04085	0.02107	0.02310
	(0.00070)*	(0.00067)*	(0.00218)*	(0.01527)	(0.00276)	(0.00253)*	(0.00668)	(0.12383)	(0.01437)*	(0.00080)*	(0.00199)*
# Kickbacks in Month T-2	0.01886	0.01559	0.01824	0.01329	0.00560	0.02102	0.00888	-0.31673	0.06466	0.01636	0.01208
	(0.00072)*	(0.00068)*	(0.00217)*	(0.01433)	(0.00281)	(0.00259)*	(0.00661)	(0.12309)	(0.01407)*	(0.00082)*	(0.00211)*
# Kickbacks in Month T-3	0.01351	0.01123	0.01708	-0.05001	0.00101	0.02130	-0.00575	-0.33117	0.04706	0.01420	0.01286
	(0.00072)*	(0.00069)*	(0.00212)*	(0.01384)*	(0.00288)	(0.00260)*	(0.00653)	(0.12417)*	(0.01375)*	(0.00083)*	(0.00215)*
# Kickbacks in Month T-4	0.01103	0.01174	0.01437	0.01414	0.00300	0.02669	0.00548	-0.17033	0.04392	0.01081	0.00066
	(0.00073)*	(0.00069)*	(0.00208)*	(0.01275)	(0.00293)	(0.00258)*	(0.00623)	(0.11975)	(0.01344)*	(0.00084)*	(0.00218)
# Kickbacks in Month T-5	0.00998	0.01357	0.01519	0.03043	0.00296	0.02004	-0.00246	-0.01045	0.01926	0.01225	-0.00819
	(0.00073)*	(0.00069)*	(0.00205)*	(0.01173)*	(0.00298)	(0.00258)*	(0.00601)	(0.10579)	(0.01339)	(0.00085)*	(0.00223)*
# Kickbacks in Month T-6	0.01156	0.01126	0.00904	0.01847	0.00551	0.01907	0.00649	-0.22316	0.00428	0.01075	-0.01010
	(0.00073)*	(0.00069)*	(0.00202)*	(0.01136)	(0.00303)	(0.00257)*	(0.00587)	(0.09781)	(0.01298)	(0.00086)*	(0.00220)*
# Kickbacks in Month T-7	0.01054	0.00939	0.01833	0.01479	-0.00351	0.01135	0.00326	-0.11896	0.02414	0.00790	-0.00289
	(0.00073)*	(0.00070)*	(0.00199)*	(0.01063)	(0.00309)	(0.00255)*	(0.00572)	(0.09553)	(0.01219)	(0.00088)*	(0.00213)
# Kickbacks in Month T-8	0.00990	0.01255	0.01377	-0.01121	0.00505	0.00889	-0.00154	0.17191	0.02259	0.00554	-0.01048
	(0.00073)*	(0.00069)*	(0.00197)*	(0.00958)	(0.00314)	(0.00253)*	(0.00558)	(0.08900)	(0.01163)	(0.00090)*	(0.00215)*
# Kickbacks in Month T-9	0.01064	0.01128	0.01797	0.03227	-0.00248	0.00232	0.00315	-0.01799	-0.01173	0.00557	-0.00447
	(0.00073)*	(0.00069)*	(0.00194)*	(0.00867)*	(0.00319)	(0.00252)	(0.00541)	(0.09170)	(0.01140)	(0.00091)*	(0.00208)
# Kickbacks in Month T-10	0.01056	0.01141	0.01451	-0.00525	0.00157	0.01206	0.00465	0.05218	-0.03078	0.00685	-0.00732
	(0.00073)*	(0.00069)*	(0.00191)*	(0.00846)	(0.00325)	(0.00249)*	(0.00524)	(0.07944)	(0.01081)*	(0.00092)*	(0.00209)*
# Kickbacks in Month T-11	0.00989	0.01406	0.01942	0.02529	0.00073	0.00949	0.00812	-0.15378	0.00635	0.00250	-0.01191
	(0.00073)*	(0.00069)*	(0.00186)*	(0.00803)*	(0.00325)	(0.00245)*	(0.00508)	(0.07814)	(0.01008)	(0.00094)*	(0.00204)*
# Kickbacks in Month T-12	0.01129	0.01762	0.02133	0.01616	0.00294	0.02158	0.03431	0.00821	-0.03098	0.00827	-0.01422
	(0.00072)*	(0.00068)*	(0.00181)*	(0.00770)	(0.00324)	(0.00237)*	(0.00486)*	(0.07652)	(0.00919)*	(0.00093)*	(0.00204)*
Observations	10,137,115	8,173,065	1,086,067	184,650	543,438	786,681	172,151	6,343	124,847	4,666,841	
Number of Doctors	302,099	251,274	70,912	21,407	51,769	60,608	18,960	1,780	16,926	196,556	
Likelihood Ratio Test											
LL with kickbacks	-18,223,815	-14,527,597	-1,386,230	-202,396	-664,724	-895,218	-173,244	-5,972	-143,261	-8,261,051	
LL without kickbacks	-18,231,090	-14,536,639	-1,388,315	-202,435	-664,738	-896,520	-173,289	-5,989	-143,307	-8,264,294	
chi2(12)^	14,550	18,083	4,170	78	28	2,605	90	33	92	6,487	
Prob > chi2	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.001	0.000	0.000	

Notes: Table shows regression output for the shifted Poisson model with doctor fixed effects and month-year fixed effects; all doctors included. Standard errors are shown in parentheses. For Lotrel, dates listed above the columns are inclusive; FDA approved Lotrel's generic equivalent in May 2007. The model for Lotrel includes both kickbacks vector before 4/2007 and after 5/2007. Chi2 test statistic is calculated as -2 x (LL with kickbacks - LL without kickbacks). * p<0.01; ^ chi2(24) for Lotrel.

Appendix F. Damages Tables Excluding Events Associated Only with Pre-2010 Settlement Drugs

Table 1: Number of Unique Doctors Who Wrote More Prescriptions As a Result of Kickbacks

	2004	2005	2006	2007	2008	2009	2010	2011	Total: Any Year
Diovan	2,893	12,349	15,776	11,508	6,645	3,052	2,876	1,826	21,423
Diovan HCT	2,808	12,010	15,449	11,355	6,545	3,035	2,837	1,778	21,048
Exforge				4,300	4,204	2,579	2,314	1,520	6,764
Exforge HCT						942	1,035	855	1,601
Lotrel	2,851	12,249	15,493	9,550					18,051
Starlix	1,070	4,730	6,193	4,256					8,608
Tekturna				4,452	3,464	2,136	1,941	1,391	6,364
Tekturna HCT					957	1,099	960	778	2,007
Valturna						238	1,109	937	1,345
Total: Any Drug	3,093	13,012	16,303	11,870	6,895	3,130	3,035	1,861	21,806

Notes: Table reports the number of doctors with positive incremental new prescriptions based on the shifted Poisson model estimated on IMS data. Each cell reports the number of unique doctors based on NOVID; thus, "Total: Any Drugs" and "Total: Any Years" are not the sum across the rows or columns, respectively, to avoid double-counting doctors. IMS data for Starlix is missing after 2007 (exclusive). In this alternative scenario, kickbacks associated with an event associated only with Diovan, Exforge, or Tekturna (but not the HCT versions of those drugs) before 2010 are excluded for damages purposes.

Table 2: Summary of Damages across Drugs at Issue by Health Care Program

	Number of Rx, in thousands	Damages, in US$ millions
Medicare Part D (2006-2015)	2,685	$147,915
Medicaid (2004-2011)		
FFS - U.S.	206	$8,204
FFS - States	159	$5,249
Managed Care - U.S.	155	$6,839
Managed Care - States	154	$6,752
TRICARE (2004-2011)	216	$19,063
Total: Gov. Programs	3,262	$194,021

Notes: Prescriptions data from Medicare Part D, Medicaid, and TRICARE. Payment information for Medicare Part D is based on government impact from MEDIC. Payment information for Medicaid and TRICARE are included in the prescriptions data. Medicaid breakout for FFS and MC between state and federal is based on FMAP. Damages for Medicare Part D span the period 2006-2015. Damages for Medicaid and TRICARE are based on scripts between 2004 and 2011.

Table 3: Damages for Medicare Part D, 2006-2015

	Medicare Part D	
	Number of Rx	Amount Paid
Diovan	231,996	$14,894,971
Diovan HCT	1,454,171	$74,768,479
Exforge	70,840	$5,028,528
Exforge HCT	13,183	$897,495
Lotrel	763,674	$42,237,357
Starlix	67,975	$4,979,493
Tekturna	52,343	$3,379,549
Tekturna HCT	17,792	$1,074,215
Valturna	12,580	$654,804
Total: All Drugs	2,684,554	$147,914,892

Notes: Number of Rx includes (i) new prescriptions that were written during a month when the doctor was influenced by kickbacks and (ii) the subsequent refills of these new prescriptions. Medicare Part D prescriptions data comes from CMS. Amount Paid is based on the MEDIC government impact numbers. For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted.

Table 4: Damages for Medicaid, 2004-2011

	Medicaid FFS - U.S.		Medicaid FFS - States		Medicaid MC - U.S.		Medicaid MC - States	
	Number of Rx	Amount Paid	Number of Rx	Amount Paid	Number of Rx	Amount Paid	Number of Rx	Amount Paid
Diovan	10,337	$519,955	7,614	$376,682	1,799	$99,525	1,659	$88,704
Diovan HCT	117,908	$4,175,642	94,512	$2,906,635	85,304	$3,699,602	84,902	$3,642,631
Exforge	5,130	$204,290	4,122	$133,379	311	$18,144	277	$15,976
Exforge HCT	561	$33,178	288	$14,253	30	$2,121	24	$1,770
Lotrel	60,291	$2,743,147	42,795	$1,494,807	54,488	$2,412,458	54,488	$2,400,221
Starlix	6,844	$356,912	4,747	$194,683	6,160	$348,379	6,160	$347,955
Tekturna	2,421	$89,911	2,027	$64,336	282	$17,492	255	$15,430
Tekturna HCT	1,866	$50,304	1,731	$43,544	3,459	$138,837	3,449	$137,697
Valturna	933	$30,194	812	$20,691	2,720	$102,054	2,718	$101,930
Total: All Drugs	206,291	$8,203,532	158,648	$5,249,010	154,553	$6,838,613	153,932	$6,752,313

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent refills from Medicaid data. Amount Paid is reported in the Medicaid data under the field, “amount paid.” FFS stands for Fee-for-Service. For both FFS and Managed Care, payments to the United States and state governments are apportioned using the annual Federal Medical Assistance Percentages. The portion allocated to the United States includes all states whereas the portion allocated to state governments includes only the states included in the relator’s Third Amended Complaint. For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted.

Table 5: Damages for Tricare, 2004-2011

	TRICARE	
	Number of Rx	**Amount Paid**
Diovan	7,942	$751,883
Diovan HCT	100,562	$8,076,895
Exforge	4,266	$510,799
Exforge HCT	1,049	$123,216
Lotrel	89,416	$8,140,511
Starlix	6,938	$825,950
Tekturna	3,090	$323,801
Tekturna HCT	1,767	$166,446
Valturna	1,379	$143,338
Total: All Drugs	216,409	$19,062,840

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent fills from TRICARE prescriptions data. Amount Paid is reported in the TRICARE data under the field, "submitted amount." For Diovan, Exforge, and Tekturna, total and prescriptions and payments prior to January 2010 are excluded. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted.

Appendix G. Damages Sensitivities Based on Incremental New Prescriptions

Table 1: Summary of Damages across Drugs at Issue by Health Care Program

	Number of Rx, in thousands	Damages, in US$ millions
Medicare Part D (2006-2015)	270	$14,133
Medicaid (2004-2011)		
FFS - U.S.	21	$793
FFS - States	16	$505
Managed Care - U.S.	18	$772
Managed Care - States	18	$763
TRICARE (2004-2011)	20	$1,710
Total: Gov. Programs	330	$18,677

Notes: Prescriptions data from Medicare Part D, Medicaid, and TRICARE. Payment information for Medicare Part D is based on government impact from MEDIC. Payment information for Medicaid and TRICARE are included in the prescriptions data. Medicaid breakout for FFS and MC between states and the United States is based on FMAP. Damages for Medicare Part D span the period 2006-2015. Damages for Medicaid and TRICARE are based on scripts between 2004 and 2011. Total Gov. Programs does not equal the sum across the rows because prescriptions may be counted twice under Medicaid – once for the United States and again for the states. Prescriptions and payments for Tekamlo and, after May 2007 (inclusive), Lotrel are excluded.

Table 2: Damages for Medicare Part D, 2006-2015

	Medicare Part D	
	Number of Rx	**Amount Paid**
Diovan	7,719	$473,971
Diovan HCT	199,181	$10,003,629
Exforge	3,079	$215,623
Exforge HCT	465	$30,173
Lotrel	55,383	$3,106,039
Starlix	1,171	$88,787
Tekturna	2,041	$134,888
Tekturna HCT	1,046	$59,671
Valturna	395	$20,713
Total: All Drugs	270,478	$14,133,493

Notes: Number of Rx includes (i) new prescriptions that were written during a month when the doctor was influenced by kickbacks and (ii) the subsequent refills of these new prescriptions. Medicare Part D prescriptions data comes from CMS. Amount Paid is based on the MEDIC government impact numbers. For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted.

Table 3: Damages for Medicaid, 2004-2011

	Medicaid FFS - U.S.		Medicaid FFS - States		Medicaid MC - U.S.		Medicaid MC - States	
	Number of Rx	Amount Paid	Number of Rx	Amount Paid	Number of Rx	Amount Paid	Number of Rx	Amount Paid
Diovan	324	$15,466	246	$11,387	53	$2,802	48	$2,430
Diovan HCT	15,765	$540,188	12,381	$364,381	12,473	$525,759	12,430	$518,617
Exforge	254	$9,471	205	$6,123	13	$743	11	$626
Exforge HCT	22	$1,600	10	$607	1	$80	1	$68
Lotrel	4,664	$210,416	3,184	$112,126	4,937	$215,993	4,937	$215,221
Starlix	126	$6,751	84	$3,591	145	$7,954	145	$7,949
Tekturna	99	$3,371	87	$2,577	9	$544	8	$460
Tekturna HCT	146	$4,426	134	$3,651	318	$12,148	317	$12,082
Valturna	26	$1,061	24	$804	132	$5,848	132	$5,842
Total: All Drugs	21,426	$792,749	16,355	$505,246	18,082	$771,871	18,031	$763,295

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent refills from Medicaid data. Amount Paid is reported in the Medicaid data under the field, "amount paid." FFS stands for Fee-for-Service. For both FFS and Managed Care, payments to the United States and state governments are apportioned using the annual Federal Medical Assistance Percentages. The portion allocated to the United States includes all states whereas the portion allocated to state governments includes only the states on the relator's Third Amended Complaint. For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted.

Table 4: Damages for TRICARE, 2004-2011

	TRICARE	
	Number of Rx	**Amount Paid**
Diovan	241	$21,905
Diovan HCT	12,473	$1,008,371
Exforge	191	$22,333
Exforge HCT	48	$5,521
Lotrel	6,644	$611,054
Starlix	121	$14,750
Tekturna	115	$11,619
Tekturna HCT	126	$10,951
Valturna	38	$3,544
Total: All Drugs	19,998	$1,710,048

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent fills from TRICARE prescriptions data. Amount Paid is reported in the TRICARE data under the field, "submitted amount." For Diovan, Exforge, and Tekturna, total and excess prescriptions prior to January 2010 are excluded. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted.

Table 5: Summary of Damages across Drugs at Issue by Health Care Program: Alternative Scenario

	Number of Rx, in thousands	Damages, in US$ millions
Medicare Part D (2006-2015)	70	$3,796
Medicaid (2004-2011)		
FFS - U.S.	5	$205
FFS - States	4	$132
Managed Care - U.S.	5	$207
Managed Care - States	5	$205
TRICARE (2004-2011)	5	$425
Total: Gov. Programs	85	$4,971

Notes: Prescriptions data from Medicare Part D, Medicaid, and TRICARE. Payment information for Medicare Part D is based on government impact from MEDIC. Payment information for Medicaid and TRICARE are included in the prescriptions data. Medicaid breakout for FFS and MC between states and the U.S. is based on FMAP. Damages for Medicare Part D span the period 2006-2015. Damages for Medicaid and TRICARE are based on scripts between 2004 and 2011. Total Gov. Programs does not equal the sum across the rows because prescriptions may be counted twice under Medicaid – once for the United States and again for the states. In the alternative scenario, events associated only with pre-2010 settlement drugs are excluded from calculating damages. Prescriptions and payments for Tekamlo and, after May 2007 (inclusive), Lotrel are excluded.

Table 6: Damages for Medicare Part D, 2006-2015: Alternative Scenario

	Medicare Part D	
	Number of Rx	Amount Paid
Diovan	4,634	$301,417
Diovan HCT	42,212	$2,158,220
Exforge	1,875	$137,431
Exforge HCT	173	$12,108
Lotrel	18,693	$1,038,934
Starlix	300	$22,660
Tekturna	1,380	$93,768
Tekturna HCT	172	$10,704
Valturna	394	$20,672
Total: All Drugs	69,832	$3,795,915

Notes: Number of Rx includes (i) new prescriptions that were written during a month when the doctor was influenced by kickbacks and (ii) the subsequent refills of these new prescriptions. Medicare Part D prescriptions data comes from CMS. Amount Paid is based on the MEDIC government impact numbers. For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted. In the alternative scenario, events associated only with pre-2010 settlement drugs are excluded from calculating damages.

Table 7: Damages for Medicaid, 2004-2011: Alternative Scenario

	Medicaid FFS - U.S.		Medicaid FFS - States		Medicaid MC - U.S.		Medicaid MC - States	
	Number of Rx	Amount Paid	Number of Rx	Amount Paid	Number of Rx	Amount Paid	Number of Rx	Amount Paid
Diovan	191	$9,493	150	$7,341	32	$1,699	30	$1,520
Diovan HCT	3,333	$112,926	2,659	$77,802	2,890	$122,499	2,880	$121,083
Exforge	157	$5,330	138	$3,995	9	$493	8	$448
Exforge HCT	11	$944	6	$372	1	$62	1	$55
Lotrel	1,558	$70,777	1,099	$38,744	1,652	$72,067	1,652	$71,784
Starlix	32	$1,760	21	$889	39	$2,089	39	$2,088
Tekturna	69	$2,225	62	$1,754	6	$381	6	$330
Tekturna HCT	22	$590	20	$507	52	$2,148	52	$2,140
Valturna	25	$931	23	$720	140	$5,980	140	$5,975
Total: All Drugs	5,399	$204,976	4,178	$132,124	4,821	$207,419	4,807	$205,422

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent refills from Medicaid data. Amount Paid is reported in the Medicaid data under the field, "amount paid." FFS stands for Fee-for-Service. For both FFS and Managed Care, payments to the United States and state governments are apportioned using the annual Federal Medical Assistance Percentages. The portion allocated to the United States includes all states whereas the portion allocated to state governments includes only the states on the relator's Third Amended Complaint. For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted. In the alternative scenario, events associated only with pre-2010 settlement drugs are excluded from calculating damages.

Table 8: Damages for TRICARE, 2004-2011: Alternative Scenario

	TRICARE	
	Number of Rx	Amount Paid
Diovan	132	$12,311
Diovan HCT	2,514	$198,709
Exforge	105	$12,617
Exforge HCT	13	$1,511
Lotrel	2,042	$184,942
Starlix	28	$3,316
Tekturna	63	$6,550
Tekturna HCT	16	$1,618
Valturna	35	$3,512
Total: All Drugs	4,947	$425,087

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent fills from TRICARE prescriptions data. Amount Paid is reported in the TRICARE data under the field, "submitted amount." For Diovan, Exforge, and Tekturna, total and excess prescriptions prior to January 2010 are excluded. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted. In the alternative scenario, events associated only with pre-2010 settlement drugs are excluded from calculating damages.

Appendix H. MEDIC 4172 Impact Calculation 7-12-17

CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES
CENTER FOR PROGRAM INTEGRITY

Medicare Drug Integrity Contractor (MEDIC)

July 12, 2017

Henry Thomson-Smith
Department of Justice
United States Attorney's Office
Southern District of New York
86 Chambers Street, 3rd Floor
New York, NY 10007

RE: MEDIC CASE #4172 calculation of financial impact to government for a Part D case

Dear Mr. Thomson-Smith:

Health Integrity received your request to perform calculations to determine the impact on Part D associated with a manufacturer during the time period of 2006 through 2015. Pursuant to your request, the tables referenced at Attachment II have been prepared and attached for your review. Our impact assumptions are based on actual Prescription Drug Event (PDE) data associated with the manufacturer in question. The methodology for our calculation is described and included at Attachment I.

This report contains, as requested, a calculation of estimated impact to the government based on MEDIC review and analysis of certain PDE records identified by the requestor. This calculation of estimated impact is derived from and limited to the PDE specifications identified for MEDIC analysis by the requestor. In performing this impact calculation, CMS and Health Integrity are not providing guidance to assist you in evaluating the merits of your case. CMS and Health Integrity do not have the necessary information to determine whether a damages assessment is appropriate given the facts of your case.

Should you have any questions related to this calculation, please contact me at 410-581-4555 or aranck@mslc.com.

Sincerely,

Andrew Ranck, CPA

Attachment I: Methodology for Impact Calculation

Our calculation is based on PDE records for a manufacturer, Novartis, filled from 1/1/2006 through 12/31/2015. In order to perform the calculations, we summarize the PDE based on the needs of the requestor. The file developed was specifically related to PDE records associated with the manufacturer. We summarized the data by drug and year. The summary was performed using Microsoft Excel and IDEA® Data Analysis software.

In estimating the total impact on Part D, the impact on the government is calculated in three portions (Reinsurance, LICS and Risk Sharing). We also estimated the total impact on Part D (Total Impact to the Government, Total Impact to the Plan, Portion Paid by the Beneficiary, Patient Liability Reduction due to Other Payer Amount (PLRO) & Other True Out of Pocket Costs (TrOOP)). The following explains the calculations performed for this review:

Reinsurance Subsidy - The reinsurance subsidy is a federal subsidy for 80% of allowable drug costs above the out-of-pocket threshold (catastrophic phase). PDE processed in the catastrophic phase are recorded in the Gross Drug Cost Above Threshold (GDCA) field of the PDE. In calculating the impact to the government, the questionable PDE are compared to the total recorded in the GDCA field. In our calculations, we took the sum of the amounts recorded in the GDCA field and multiplied that sum by 80% to determine the impact to the government. If beneficiaries are in the catastrophic coverage phase with Medicare as a secondary insurance (payments in PLRO), we will not calculate reinsurance on amounts paid by a primary insurer. In such cases, we removed PLRO from GDCA and then multiplied by 80%.

Low Income Cost-Sharing Subsidy (LICS) - Medicare subsidizes the cost-sharing liability of qualifying low income beneficiaries. While the actual LICS amount is recorded in the PDE, the amount of LICS per PDE varies based on the phase of the benefit in which the PDE was processed. In calculating the impact to the government for the allegations, we summed the amounts included in the LICS field of the PDE.

Risk Sharing - The federal government and the plan share the profits and losses resulting from expenses for the standard benefit within defined symmetrical risk corridors around a target amount. The risk sharing calculation is performed at the plan level on an annual basis, as opposed to at the beneficiary level. In calculating the impact of questionable PDE on risk sharing, it is necessary to determine where the plan's cost fell with respect to the risk corridors. For years in which the reconciliation was completed (2006-2015) by CMS, we used the appropriate risk corridor used in the reconciliation.

Risk Sharing Calculation - We first reviewed the CMS reconciliation files for each of the plans that processed PDE in 2006-2015 to determine where the plans' costs fell with

respect to the risk corridors. The appropriate risk sharing percentages for the plans associated with this case were then extracted.

In calculating risk sharing, the simplified formula is:

(CPP from the PDE - Reinsurance)*risk corridor %.

In this scenario, there are PDE processed with amounts recorded in the Covered D Plan Paid Amounts (CPP) and Non-Covered Plan Paid Amounts (NPP) fields of the PDE, so GDCA and GDCB cannot be the basis for our calculations. Therefore, for this scenario it is necessary to deduct reinsurance based on GDCA from the CPP amounts recorded in the PDE. For purposes of estimating the impact to the government, the following calculation will be used:

Risk Sharing = [CPP from the PDE - (80% * GDCA)] * risk corridor %

Impact to Plan Calculation - In calculating the impact to the plans, the simplified formula is:

(CPP + NPP - Risk Sharing - Reinsurance).

The Risk Sharing formula from above will be used in our calculations of the impact to the plans.

Portion paid by the beneficiary - Patient pay amount recorded in the PDE.

PLRO & Other TrOOP - Sum of PLRO & Other TrOOP amounts recorded in the PDE.

Effective January 1, 2011, Part D sponsors are required to report manufacturer discounts in the Reported Gap Discount PDE field. This field, along with CPP, NPP, Patient Pay Amount, LICS, Other TrOOP Amount, and PLRO, comprise the seven payment fields. Please note, the total paid amount included in this report for PDE records filled during 2011 or later does not include the Reported Gap Discount field and therefore may not represent the total amount paid by all payers.

Please see the link below, specifically section 18, for more information.
https://www.federalregister.gov/documents/2011/04/15/2011-8274/medicare-program-changes-to-the-medicare-advantage-and-the-medicare-prescription-drug-benefit

Attachment II

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Attachment II

Impact Calculation by Drug and Year

Drug and Year	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
DIOVAN	22,872,222	$ 165,211,581.06	$ 615,684,819.79	$ 601,664,078.70	$ 1,382,560,479.55	$ 703,443,592.80	$ 641,274,474.51	$ 29,375,244.14	$ 35,648,004.34	$ 2,792,301,795.34
2006	2,208,882	$ 7,964,735.89	$ 39,291,857.36	$ 45,280,901.25	$ 92,537,494.50	$ 19,657,925.59	$ 44,436,979.19	$ 1,238,965.19	$ 168,809.25	$ 158,040,173.72
2007	2,698,830	$ 11,322,617.23	$ 50,241,297.53	$ 52,933,462.59	$ 114,497,377.35	$ 36,924,239.70	$ 59,606,128.21	$ 2,035,574.13	$ 320,710.95	$ 213,384,030.34
2008	2,883,661	$ 13,585,369.24	$ 58,394,615.75	$ 39,264,958.32	$ 111,244,943.31	$ 73,488,267.22	$ 70,434,677.99	$ 2,694,347.36	$ 414,529.55	$ 258,276,765.43
2009	2,804,714	$ 14,208,323.96	$ 60,841,181.52	$ 63,777,089.04	$ 138,826,594.52	$ 59,811,558.79	$ 79,745,375.06	$ 3,730,915.77	$ 597,657.09	$ 282,712,101.23
2010	2,887,531	$ 16,469,005.30	$ 68,708,448.94	$ 65,494,625.34	$ 150,672,079.58	$ 79,208,488.82	$ 86,715,827.53	$ 4,850,662.41	$ 610,001.64	$ 322,057,059.98
2011	2,656,140	$ 21,245,931.21	$ 80,565,402.46	$ 63,348,940.02	$ 165,160,273.69	$ 88,416,261.71	$ 76,626,281.41	$ 4,405,211.22	$ 1,112,996.38	$ 335,721,024.41
2012	2,513,859	$ 24,945,189.41	$ 88,480,847.61	$ 97,865,634.04	$ 211,291,671.06	$ 90,874,117.25	$ 78,674,849.71	$ 3,370,316.40	$ 4,203,860.13	$ 388,414,814.55
2013	2,447,985	$ 28,648,851.30	$ 86,710,791.89	$ 96,104,736.67	$ 211,464,379.86	$ 134,416,757.65	$ 84,927,668.67	$ 3,704,883.53	$ 11,986,186.19	$ 446,499,875.90
2014	1,531,128	$ 22,271,839.34	$ 65,195,670.76	$ 63,812,102.41	$ 151,279,612.51	$ 107,975,700.03	$ 52,500,028.30	$ 2,651,877.77	$ 14,277,897.82	$ 328,685,116.43
2015	239,492	$ 4,549,718.18	$ 17,254,705.97	$ 13,781,629.02	$ 35,586,053.17	$ 12,670,276.04	$ 7,606,658.44	$ 692,490.36	$ 1,955,355.34	$ 58,510,833.35
DIOVAN HCT	13,129,293	$ 62,699,141.59	$ 330,041,416.66	$ 381,084,913.44	$ 773,825,471.69	$ 416,878,072.76	$ 368,490,476.17	$ 17,736,521.28	$ 6,901,213.20	$ 1,583,831,755.10
2006	1,496,106	$ 4,040,534.44	$ 27,812,248.88	$ 37,062,052.33	$ 68,914,835.65	$ 16,100,593.57	$ 31,666,398.96	$ 867,222.75	$ 124,829.01	$ 117,673,879.94
2007	1,946,175	$ 6,361,270.67	$ 38,027,067.26	$ 47,741,846.47	$ 92,130,184.40	$ 33,729,080.89	$ 44,720,824.81	$ 1,601,119.28	$ 250,612.86	$ 172,431,822.24
2008	2,109,420	$ 8,134,638.01	$ 45,222,587.73	$ 35,698,547.48	$ 89,055,773.22	$ 69,431,979.53	$ 53,780,453.55	$ 2,234,075.43	$ 373,135.46	$ 214,875,417.19
2009	2,037,920	$ 8,717,278.70	$ 47,425,207.44	$ 58,359,833.69	$ 114,502,319.83	$ 57,608,891.56	$ 60,349,269.71	$ 3,124,914.56	$ 500,361.54	$ 236,085,757.20
2010	2,014,852	$ 9,758,850.66	$ 50,891,262.44	$ 58,295,969.29	$ 118,946,082.39	$ 72,530,032.14	$ 64,027,764.41	$ 3,870,261.60	$ 475,727.54	$ 259,849,868.08
2011	1,828,419	$ 12,728,874.28	$ 58,551,560.41	$ 57,052,729.34	$ 128,333,164.03	$ 79,750,435.20	$ 57,461,274.75	$ 3,330,420.39	$ 863,121.91	$ 269,738,416.28
2012	1,416,928	$ 10,103,101.34	$ 51,773,360.64	$ 71,451,664.71	$ 133,328,126.69	$ 69,010,509.24	$ 46,056,177.10	$ 2,146,785.99	$ 2,049,865.81	$ 252,591,464.83
2013	221,093	$ 1,505,829.63	$ 7,852,766.69	$ 13,370,525.82	$ 22,729,122.14	$ 13,875,837.08	$ 7,213,478.74	$ 375,409.36	$ 741,692.32	$ 44,935,539.64
2014	35,481	$ 664,582.87	$ 1,409,688.96	$ 970,621.96	$ 3,044,893.79	$ 2,831,856.42	$ 1,937,209.64	$ 107,559.23	$ 802,189.76	$ 8,723,708.84
2015	22,899	$ 684,180.99	$ 1,075,666.21	$ 1,081,122.35	$ 2,840,969.55	$ 2,008,857.13	$ 1,277,624.50	$ 78,752.69	$ 719,676.99	$ 6,925,880.86
EXFORGE	2,752,271	$ 24,475,987.83	$ 82,273,694.42	$ 100,923,043.58	$ 207,672,725.83	$ 141,559,031.26	$ 90,044,025.96	$ 3,891,214.14	$ 10,791,367.93	$ 453,958,365.12
2007	41,681	$ 464,560.56	$ 1,012,393.06	$ 728,636.32	$ 2,205,589.94	$ 575,163.26	$ 1,072,229.84	$ 52,138.29	$ 9,570.99	$ 3,914,692.32
2008	273,257	$ 1,634,505.35	$ 6,210,422.73	$ 4,577,544.30	$ 12,422,472.38	$ 9,403,412.57	$ 6,852,031.79	$ 288,536.74	$ 55,517.77	$ 29,021,971.25
2009	381,122	$ 2,214,957.04	$ 9,314,513.87	$ 11,181,179.96	$ 22,710,650.87	$ 11,216,006.32	$ 10,718,115.98	$ 530,344.36	$ 98,866.53	$ 45,273,984.06
2010	426,381	$ 2,539,288.34	$ 10,987,723.86	$ 12,650,238.39	$ 26,177,250.59	$ 15,476,935.48	$ 13,456,205.88	$ 695,385.60	$ 149,608.15	$ 55,955,385.70
2011	429,943	$ 3,461,143.14	$ 12,805,212.63	$ 14,104,228.95	$ 30,370,584.72	$ 19,513,466.08	$ 13,515,218.24	$ 661,696.23	$ 275,730.58	$ 64,336,695.85
2012	418,638	$ 4,017,816.12	$ 14,179,317.74	$ 20,944,322.58	$ 39,141,456.44	$ 20,827,506.36	$ 14,331,392.82	$ 526,450.81	$ 921,095.65	$ 75,747,902.08
2013	407,792	$ 4,602,398.41	$ 13,756,958.19	$ 18,283,183.51	$ 36,642,540.11	$ 29,464,473.90	$ 15,585,473.92	$ 573,205.75	$ 2,589,333.80	$ 84,855,027.48
2014	313,221	$ 4,682,513.35	$ 11,789,437.74	$ 13,378,034.63	$ 29,849,985.72	$ 29,910,063.50	$ 12,490,562.17	$ 484,222.66	$ 5,430,713.78	$ 78,165,547.83
2015	60,236	$ 858,805.52	$ 2,217,714.60	$ 5,075,674.94	$ 8,152,195.06	$ 5,172,003.79	$ 2,022,795.32	$ 79,233.70	$ 1,260,930.68	$ 16,687,158.55
EXFORGE HCT	522,414	$ 5,623,680.23	$ 17,458,866.37	$ 21,676,108.86	$ 44,758,655.46	$ 31,589,896.53	$ 17,906,305.25	$ 645,031.55	$ 2,868,885.50	$ 97,768,774.29
2009	14,638	$ 140,656.67	$ 323,633.11	$ 371,311.20	$ 835,600.98	$ 346,526.76	$ 440,613.83	$ 17,991.50	$ 5,100.46	$ 1,645,833.53
2010	66,622	$ 398,732.27	$ 1,607,996.77	$ 1,999,743.68	$ 4,006,472.72	$ 2,352,396.45	$ 2,110,144.26	$ 94,641.72	$ 23,274.08	$ 8,586,929.23
2011	94,887	$ 764,022.80	$ 2,796,168.55	$ 3,174,629.39	$ 6,734,820.74	$ 4,235,549.00	$ 2,928,653.66	$ 126,943.75	$ 53,983.70	$ 14,079,950.85
2012	110,539	$ 1,120,795.48	$ 3,753,361.81	$ 5,471,277.83	$ 10,345,435.12	$ 5,488,276.04	$ 3,687,241.80	$ 128,213.96	$ 230,572.46	$ 19,879,739.38
2013	120,621	$ 1,404,656.92	$ 4,288,729.81	$ 5,373,094.47	$ 11,066,481.20	$ 8,743,154.92	$ 4,400,204.10	$ 135,221.30	$ 715,510.97	$ 25,060,572.49
2014	103,430	$ 1,731,209.59	$ 4,240,366.14	$ 4,311,027.04	$ 10,282,602.77	$ 9,523,493.88	$ 4,012,898.73	$ 132,363.42	$ 1,696,852.05	$ 25,648,210.85
2015	11,677	$ 63,606.50	$ 448,610.18	$ 975,025.25	$ 1,487,241.93	$ 900,499.48	$ 326,548.87	$ 9,655.90	$ 143,591.78	$ 2,867,537.96

Attachment II

Impact Calculation by Drug and Year

Drug and Year	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
LOTREL	4,455,426	$ 16,562,791.87	$ 113,357,286.74	$ 134,876,113.47	$ 264,796,192.08	$ 120,035,252.75	$ 114,940,126.65	$ 4,211,860.46	$ 1,436,154.15	$ 505,419,586.09
2006	1,863,716	$ 5,672,809.95	$ 42,134,840.73	$ 55,862,309.48	$ 103,669,960.16	$ 29,755,312.27	$ 44,783,656.75	$ 988,592.72	$ 156,919.01	$ 179,354,440.91
2007	1,384,798	$ 3,157,614.52	$ 29,647,845.36	$ 46,206,221.74	$ 79,011,681.62	$ 37,094,866.34	$ 31,797,770.36	$ 1,030,895.85	$ 177,728.46	$ 149,112,942.63
2008	465,564	$ 2,164,231.64	$ 12,334,795.09	$ 10,551,854.26	$ 25,050,880.99	$ 21,055,081.95	$ 12,744,805.05	$ 491,635.66	$ 95,929.69	$ 59,438,333.34
2009	351,192	$ 2,162,635.70	$ 12,153,785.34	$ 10,170,723.38	$ 24,487,144.42	$ 13,364,017.77	$ 11,761,401.99	$ 669,234.94	$ 131,362.89	$ 50,413,162.01
2010	281,158	$ 2,216,533.24	$ 12,287,114.47	$ 8,356,248.52	$ 22,859,896.23	$ 12,354,137.24	$ 9,583,156.31	$ 767,721.30	$ 113,781.95	$ 45,678,693.03
2011	67,393	$ 505,285.17	$ 3,079,083.52	$ 2,284,222.68	$ 5,868,591.37	$ 2,932,834.17	$ 1,918,722.93	$ 158,488.37	$ 29,037.71	$ 10,907,674.55
2012	14,241	$ 141,551.62	$ 618,370.32	$ 485,068.19	$ 1,244,990.13	$ 776,276.92	$ 692,233.23	$ 29,329.92	$ 52,901.47	$ 2,795,731.67
2013	11,156	$ 142,531.97	$ 433,486.64	$ 366,068.47	$ 942,087.08	$ 1,001,122.88	$ 639,061.14	$ 27,212.85	$ 144,683.64	$ 2,754,167.59
2014	8,903	$ 192,321.73	$ 355,402.81	$ 268,433.58	$ 816,158.12	$ 907,255.51	$ 540,764.76	$ 24,628.82	$ 265,941.59	$ 2,554,748.80
2015	7,305	$ 207,276.33	$ 312,562.46	$ 324,963.17	$ 844,801.96	$ 794,347.70	$ 478,554.13	$ 24,120.03	$ 267,867.74	$ 2,409,691.56
STARLIX	777,563	$ 11,119,466.17	$ 27,776,615.56	$ 21,030,205.18	$ 59,926,286.91	$ 22,920,283.97	$ 20,401,376.38	$ 1,208,029.12	$ 453,837.17	$ 104,909,813.55
2006	191,507	$ 2,156,702.66	$ 6,024,703.25	$ 5,704,017.46	$ 13,885,423.37	$ 3,135,552.51	$ 4,112,248.86	$ 126,875.86	$ 24,044.80	$ 21,284,145.40
2007	201,799	$ 2,818,528.05	$ 6,633,970.78	$ 5,774,502.02	$ 15,227,000.85	$ 4,603,639.11	$ 5,081,318.62	$ 270,911.62	$ 42,510.11	$ 25,225,380.31
2008	189,225	$ 3,016,992.82	$ 6,851,904.48	$ 3,223,030.16	$ 13,091,927.46	$ 7,598,582.02	$ 5,163,596.46	$ 319,689.48	$ 61,438.96	$ 26,235,234.38
2009	140,463	$ 1,967,713.61	$ 6,002,431.36	$ 4,457,769.31	$ 12,427,914.28	$ 4,899,152.60	$ 4,092,124.37	$ 358,465.31	$ 69,314.15	$ 21,846,970.71
2010	35,946	$ 464,211.55	$ 1,556,239.08	$ 1,302,546.72	$ 3,322,997.35	$ 1,462,953.99	$ 1,081,665.02	$ 87,133.53	$ 10,845.28	$ 5,965,595.17
2011	5,331	$ 127,822.13	$ 195,813.49	$ 135,562.70	$ 459,198.32	$ 316,459.24	$ 201,691.47	$ 13,557.82	$ 4,084.01	$ 994,990.86
2012	5,060	$ 177,025.88	$ 187,433.18	$ 168,164.18	$ 532,623.24	$ 309,954.36	$ 239,482.18	$ 10,151.74	$ 33,314.76	$ 1,125,526.28
2013	3,568	$ 143,285.83	$ 130,128.16	$ 110,082.16	$ 383,496.15	$ 242,540.37	$ 181,805.04	$ 8,147.92	$ 64,858.78	$ 880,848.26
2014	2,624	$ 143,267.56	$ 97,462.84	$ 69,319.30	$ 310,049.70	$ 201,980.02	$ 141,865.58	$ 6,951.48	$ 82,909.90	$ 743,756.68
2015	2,040	$ 103,916.08	$ 96,528.94	$ 85,211.17	$ 285,656.19	$ 149,469.75	$ 105,578.78	$ 6,144.36	$ 60,516.42	$ 607,365.50
TEKAMLO	38,818	$ 359,923.84	$ 935,417.67	$ 990,147.52	$ 2,285,489.03	$ 1,772,877.83	$ 1,395,423.26	$ 55,542.21	$ 187,348.46	$ 5,696,680.79
2010	4	$ 79.14	$ 6.30	$ 106.29	$ 191.73	$ (13.62)	$ 366.22	$ -	$ -	$ 544.33
2011	6,956	$ 93,273.68	$ 183,655.97	$ 107,459.60	$ 384,389.25	$ 192,380.88	$ 176,614.30	$ 10,071.55	$ 3,069.98	$ 766,525.96
2012	13,550	$ 88,660.54	$ 340,780.78	$ 363,267.75	$ 792,709.07	$ 424,921.01	$ 440,113.00	$ 22,043.74	$ 25,317.84	$ 1,705,104.66
2013	8,906	$ 79,765.37	$ 197,789.76	$ 232,227.56	$ 509,782.69	$ 508,929.93	$ 355,163.26	$ 11,060.26	$ 40,699.72	$ 1,425,635.86
2014	6,842	$ 89,389.51	$ 162,751.84	$ 166,284.96	$ 418,426.31	$ 443,439.05	$ 295,312.44	$ 9,467.34	$ 74,162.60	$ 1,240,807.74
2015	2,560	$ 8,755.60	$ 50,433.02	$ 120,801.36	$ 179,989.98	$ 203,220.58	$ 127,854.04	$ 2,899.32	$ 44,098.32	$ 558,062.24
TEKTURNA	1,747,131	$ 18,433,367.33	$ 42,814,733.29	$ 39,822,473.51	$ 101,070,574.13	$ 50,794,882.28	$ 54,180,316.80	$ 2,427,056.49	$ 3,552,872.74	$ 212,025,702.44
2007	53,378	$ 615,383.14	$ 1,162,873.20	$ 580,542.44	$ 2,358,798.78	$ 392,944.48	$ 1,392,661.04	$ 53,637.96	$ 12,229.97	$ 4,210,272.23
2008	197,334	$ 1,795,331.77	$ 4,290,820.02	$ 2,064,270.45	$ 8,150,422.24	$ 4,249,091.69	$ 5,041,908.51	$ 227,801.11	$ 47,143.27	$ 17,716,366.82
2009	287,555	$ 2,629,642.56	$ 6,679,608.65	$ 5,900,027.47	$ 15,209,278.68	$ 5,401,635.74	$ 7,682,343.93	$ 418,601.46	$ 93,511.16	$ 28,805,370.97
2010	324,801	$ 3,143,688.35	$ 8,082,206.80	$ 6,635,377.65	$ 17,861,272.80	$ 7,781,581.74	$ 9,397,397.97	$ 592,233.57	$ 117,449.27	$ 35,749,935.35
2011	355,272	$ 4,316,432.17	$ 9,670,527.30	$ 7,563,626.06	$ 21,550,585.53	$ 10,283,722.37	$ 9,788,386.71	$ 525,484.80	$ 202,563.84	$ 42,350,743.25
2012	215,325	$ 1,895,531.30	$ 5,457,943.34	$ 6,930,312.77	$ 14,283,787.41	$ 6,070,025.85	$ 7,050,095.45	$ 231,799.41	$ 346,797.99	$ 27,982,506.11
2013	145,119	$ 1,473,785.45	$ 3,331,906.95	$ 4,495,084.36	$ 9,300,776.76	$ 6,825,847.42	$ 5,677,109.98	$ 156,855.25	$ 703,968.42	$ 22,664,557.83
2014	95,726	$ 1,312,331.69	$ 2,343,848.40	$ 2,568,255.87	$ 6,224,435.96	$ 4,994,986.14	$ 4,396,179.11	$ 123,661.23	$ 995,907.65	$ 16,735,170.09
2015	72,621	$ 1,251,240.90	$ 1,794,998.63	$ 3,084,976.44	$ 6,131,215.97	$ 4,795,046.85	$ 3,754,234.10	$ 96,981.70	$ 1,033,301.17	$ 15,810,779.79
TEKTURNA HCT	323,036	$ 2,702,015.36	$ 8,115,679.41	$ 8,432,561.75	$ 19,250,256.52	$ 11,300,382.84	$ 10,519,161.57	$ 436,892.04	$ 861,889.16	$ 42,368,582.13
2008	17,649	$ 198,785.01	$ 458,231.63	$ 183,003.66	$ 840,020.30	$ 286,349.26	$ 444,632.46	$ 27,190.76	$ 6,447.70	$ 1,604,640.48
2009	51,775	$ 409,703.15	$ 1,323,318.10	$ 1,062,070.55	$ 2,795,091.80	$ 1,016,184.31	$ 1,344,610.51	$ 74,842.45	$ 15,762.21	$ 5,246,491.28
2010	66,820	$ 493,977.15	$ 1,660,145.09	$ 1,510,253.84	$ 3,664,376.08	$ 1,790,930.10	$ 1,917,842.68	$ 111,619.65	$ 22,697.28	$ 7,507,465.79
2011	71,262	$ 663,010.16	$ 1,890,873.63	$ 1,701,200.74	$ 4,255,084.53	$ 2,327,166.73	$ 2,029,792.68	$ 101,148.91	$ 38,919.84	$ 8,752,112.69
2012	45,571	$ 288,822.44	$ 1,130,233.72	$ 1,593,556.76	$ 3,012,612.92	$ 1,471,935.38	$ 1,553,274.04	$ 47,468.25	$ 71,608.57	$ 6,156,899.16
2013	32,166	$ 232,558.99	$ 739,550.11	$ 1,060,069.44	$ 2,032,178.54	$ 1,785,082.74	$ 1,313,754.69	$ 29,785.42	$ 159,439.10	$ 5,320,240.49
2014	21,597	$ 219,151.73	$ 519,867.81	$ 569,467.81	$ 1,308,487.35	$ 1,385,828.32	$ 1,036,496.64	$ 26,499.54	$ 269,925.71	$ 4,027,237.56
2015	16,196	$ 196,006.73	$ 393,459.32	$ 752,938.95	$ 1,342,405.00	$ 1,236,906.00	$ 878,757.87	$ 18,337.06	$ 277,088.75	$ 3,753,494.68

Attachment II

Impact Calculation by Drug and Year

Drug and Year	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
VALTURNA	164,406	$ 1,095,108.79	$ 3,423,246.41	$ 3,444,679.32	$ 7,963,034.52	$ 4,924,698.95	$ 5,828,479.21	$ 199,840.55	$ 92,636.59	$ 19,008,689.82
2009	1,354	$ 28,934.48	$ 21,738.71	$ 17,627.52	$ 68,300.71	$ 14,101.45	$ 45,756.64	$ 1,406.06	$ 527.48	$ 130,092.34
2010	51,623	$ 364,224.48	$ 992,017.98	$ 909,162.73	$ 2,265,405.19	$ 1,129,701.12	$ 1,848,284.29	$ 65,846.21	$ 22,386.42	$ 5,331,623.23
2011	85,664	$ 662,691.69	$ 1,851,554.00	$ 1,796,050.93	$ 4,310,296.62	$ 2,837,665.02	$ 2,928,665.16	$ 107,485.35	$ 51,341.47	$ 10,235,453.62
2012	25,739	$ 38,575.96	$ 557,089.86	$ 721,715.84	$ 1,317,381.66	$ 942,570.02	$ 1,005,490.52	$ 25,102.93	$ 18,472.79	$ 3,309,017.92
2013	26	$ 682.18	$ 845.86	$ 122.30	$ 1,650.34	$ 661.34	$ 282.60	$ -	$ (91.57)	$ 2,502.71
Grand Total	**46,782,580**	**$ 308,283,064.07**	**$ 1,241,881,776.32**	**$ 1,313,944,325.33**	**$ 2,864,109,165.72**	**$ 1,505,218,971.97**	**$ 1,324,980,165.76**	**$ 60,187,231.98**	**$ 62,794,209.24**	**$ 5,817,289,744.67**

Attachment II - 2006

Impact Calculation by Drug

Drug	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
DIOVAN	2,208,882	$ 7,964,735.89	$ 39,291,857.36	$ 45,280,901.25	$ 92,537,494.50	$ 19,657,925.59	$ 44,436,979.19	$ 1,238,965.19	$ 168,809.25	$ 158,040,173.72
DIOVAN HCT	1,496,106	$ 4,040,534.44	$ 27,812,248.88	$ 37,062,052.33	$ 68,914,835.65	$ 16,100,593.57	$ 31,666,398.96	$ 867,222.75	$ 124,829.01	$ 117,673,879.94
LOTREL	1,863,716	$ 5,672,809.95	$ 42,134,840.73	$ 55,862,309.48	$ 103,669,960.16	$ 29,755,312.27	$ 44,783,656.75	$ 988,592.72	$ 156,919.01	$ 179,354,440.91
STARLIX	191,507	$ 2,156,702.66	$ 6,024,703.25	$ 5,704,017.46	$ 13,885,423.37	$ 3,135,552.51	$ 4,112,248.86	$ 126,875.86	$ 24,044.80	$ 21,284,145.40
Grand Total	**5,760,211**	**$ 19,834,782.94**	**$ 115,263,650.22**	**$ 143,909,280.52**	**$ 279,007,713.68**	**$ 68,649,383.94**	**$ 124,999,283.76**	**$ 3,221,656.52**	**$ 474,602.07**	**$ 476,352,639.97**

Attachment II - 2007

Impact Calculation by Drug

Drug	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
DIOVAN	2,698,830	$ 11,322,617.23	$ 50,241,297.53	$ 52,933,462.59	$ 114,497,377.35	$ 36,924,239.70	$ 59,606,128.21	$ 2,035,574.13	$ 320,710.95	$ 213,384,030.34
DIOVAN HCT	1,946,175	$ 6,361,270.67	$ 38,027,067.26	$ 47,741,846.47	$ 92,130,184.40	$ 33,729,080.89	$ 44,720,824.81	$ 1,601,119.28	$ 250,612.86	$ 172,431,822.24
EXFORGE	41,681	$ 464,560.56	$ 1,012,393.06	$ 728,636.32	$ 2,205,589.94	$ 575,163.26	$ 1,072,229.84	$ 52,138.29	$ 9,570.99	$ 3,914,692.32
LOTREL	1,384,798	$ 3,157,614.52	$ 29,647,845.36	$ 46,206,221.74	$ 79,011,681.62	$ 37,094,866.34	$ 31,797,770.36	$ 1,030,895.85	$ 177,728.46	$ 149,112,942.63
STARLIX	201,799	$ 2,818,528.05	$ 6,633,970.78	$ 5,774,502.02	$ 15,227,000.85	$ 4,603,639.11	$ 5,081,318.62	$ 270,911.62	$ 42,510.11	$ 25,225,380.31
TEKTURNA	53,378	$ 615,383.14	$ 1,162,873.20	$ 580,542.44	$ 2,358,798.78	$ 392,944.48	$ 1,392,661.04	$ 53,637.96	$ 12,229.97	$ 4,210,272.23
Grand Total	**6,326,661**	**$ 24,739,974.17**	**$ 126,725,447.19**	**$ 153,965,211.58**	**$ 305,430,632.94**	**$ 113,319,933.78**	**$ 143,670,932.88**	**$ 5,044,277.13**	**$ 813,363.34**	**$ 568,279,140.07**

Attachment II - 2008

Impact Calculation by Drug

Drug	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
DIOVAN	2,883,661	$ 13,585,369.24	$ 58,394,615.75	$ 39,264,958.32	$ 111,244,943.31	$ 73,488,267.22	$ 70,434,677.99	$ 2,694,347.36	$ 414,529.55	$ 258,276,765.43
DIOVAN HCT	2,109,420	$ 8,134,638.01	$ 45,222,587.73	$ 35,698,547.48	$ 89,055,773.22	$ 69,431,979.53	$ 53,780,453.55	$ 2,234,075.43	$ 373,135.46	$ 214,875,417.19
EXFORGE	273,257	$ 1,634,505.35	$ 6,210,422.73	$ 4,577,544.30	$ 12,422,472.38	$ 9,403,412.57	$ 6,852,031.79	$ 288,536.74	$ 55,517.77	$ 29,021,971.25
LOTREL	465,564	$ 2,164,231.64	$ 12,334,795.09	$ 10,551,854.26	$ 25,050,880.99	$ 21,055,081.95	$ 12,744,805.05	$ 491,635.66	$ 95,929.69	$ 59,438,333.34
STARLIX	189,225	$ 3,016,992.82	$ 6,851,904.48	$ 3,223,030.16	$ 13,091,927.46	$ 7,598,582.02	$ 5,163,596.46	$ 319,689.48	$ 61,438.96	$ 26,235,234.38
TEKTURNA	197,334	$ 1,795,331.77	$ 4,290,820.02	$ 2,064,270.45	$ 8,150,422.24	$ 4,249,091.69	$ 5,041,908.51	$ 227,801.11	$ 47,143.27	$ 17,716,366.82
TEKTURNA HCT	17,649	$ 198,785.01	$ 458,231.63	$ 183,003.66	$ 840,020.30	$ 286,349.26	$ 444,632.46	$ 27,190.76	$ 6,447.70	$ 1,604,640.48
Grand Total	**6,136,110**	**$ 30,529,853.84**	**$ 133,763,377.43**	**$ 95,563,208.63**	**$ 259,856,439.90**	**$ 185,512,764.24**	**$ 154,462,105.81**	**$ 6,283,276.54**	**$ 1,054,142.40**	**$ 607,168,728.89**

Attachment II - 2009

Impact Calculation by Drug

Drug	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
DIOVAN	2,804,714	$ 14,208,323.96	$ 60,841,181.52	$ 63,777,089.04	$ 138,826,594.52	$ 59,811,558.79	$ 79,745,375.06	$ 3,730,915.77	$ 597,657.09	$ 282,712,101.23
DIOVAN HCT	2,037,920	$ 8,717,278.70	$ 47,425,207.44	$ 58,359,833.69	$ 114,502,319.83	$ 57,608,891.56	$ 60,349,269.71	$ 3,124,914.56	$ 500,361.54	$ 236,085,757.20
EXFORGE	381,122	$ 2,214,957.04	$ 9,314,513.87	$ 11,181,179.96	$ 22,710,650.87	$ 11,216,006.32	$ 10,718,115.98	$ 530,344.36	$ 98,866.53	$ 45,273,984.06
EXFORGE HCT	14,638	$ 140,656.67	$ 323,633.11	$ 371,311.20	$ 835,600.98	$ 346,526.76	$ 440,613.83	$ 17,991.50	$ 5,100.46	$ 1,645,833.53
LOTREL	351,192	$ 2,162,635.70	$ 12,153,785.34	$ 10,170,723.38	$ 24,487,144.42	$ 13,364,017.77	$ 11,761,401.99	$ 669,234.94	$ 131,362.89	$ 50,413,162.01
STARLIX	140,463	$ 1,967,713.61	$ 6,002,431.36	$ 4,457,769.31	$ 12,427,914.28	$ 4,899,152.60	$ 4,092,124.37	$ 358,465.31	$ 69,314.15	$ 21,846,970.71
TEKTURNA	287,555	$ 2,629,642.56	$ 6,679,608.65	$ 5,900,027.47	$ 15,209,278.68	$ 5,401,635.74	$ 7,682,343.93	$ 418,601.46	$ 93,511.16	$ 28,805,370.97
TEKTURNA HCT	51,775	$ 409,703.15	$ 1,323,318.10	$ 1,062,070.55	$ 2,795,091.80	$ 1,016,184.31	$ 1,344,610.51	$ 74,842.45	$ 15,762.21	$ 5,246,491.28
VALTURNA	1,354	$ 28,934.48	$ 21,738.71	$ 17,627.52	$ 68,300.71	$ 14,101.45	$ 45,756.64	$ 1,406.06	$ 527.48	$ 130,092.34
Grand Total	**6,070,733**	**$ 32,479,845.87**	**$ 144,085,418.10**	**$ 155,297,632.12**	**$ 331,862,896.09**	**$ 153,678,075.30**	**$ 176,179,612.02**	**$ 8,926,716.41**	**$ 1,512,463.51**	**$ 672,159,763.33**

Attachment II - 2010

Impact Calculation by Drug

Drug	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
DIOVAN	2,887,531	$ 16,469,005.30	$ 68,708,448.94	$ 65,494,625.34	$ 150,672,079.58	$ 79,208,488.82	$ 86,715,827.53	$ 4,850,662.41	$ 610,001.64	$ 322,057,059.98
DIOVAN HCT	2,014,852	$ 9,758,850.66	$ 50,891,262.44	$ 58,295,969.29	$ 118,946,082.39	$ 72,530,032.14	$ 64,027,764.41	$ 3,870,261.60	$ 475,727.54	$ 259,849,868.08
EXFORGE	426,381	$ 2,539,288.34	$ 10,987,723.86	$ 12,650,238.39	$ 26,177,250.59	$ 15,476,935.48	$ 13,456,205.88	$ 695,385.60	$ 149,608.15	$ 55,955,385.70
EXFORGE HCT	66,622	$ 398,732.27	$ 1,607,996.77	$ 1,999,743.68	$ 4,006,472.72	$ 2,352,396.45	$ 2,110,144.26	$ 94,641.72	$ 23,274.08	$ 8,586,929.23
LOTREL	281,158	$ 2,216,533.24	$ 12,287,114.47	$ 8,356,248.52	$ 22,859,896.23	$ 12,354,137.24	$ 9,583,156.31	$ 767,721.30	$ 113,781.95	$ 45,678,693.03
STARLIX	35,946	$ 464,211.55	$ 1,556,239.08	$ 1,302,546.72	$ 3,322,997.35	$ 1,462,953.99	$ 1,081,665.02	$ 87,133.53	$ 10,845.28	$ 5,965,595.17
TEKAMLO	4	$ 79.14	$ 6.30	$ 106.29	$ 191.73	$ (13.62)	$ 366.22	$ -	$ -	$ 544.33
TEKTURNA	324,801	$ 3,143,688.35	$ 8,082,206.80	$ 6,635,377.65	$ 17,861,272.80	$ 7,781,581.74	$ 9,397,397.97	$ 592,233.57	$ 117,449.27	$ 35,749,935.35
TEKTURNA HCT	66,820	$ 493,977.15	$ 1,660,145.09	$ 1,510,253.84	$ 3,664,376.08	$ 1,790,930.10	$ 1,917,842.68	$ 111,619.65	$ 22,697.28	$ 7,507,465.79
VALTURNA	51,623	$ 364,224.48	$ 992,017.98	$ 909,162.73	$ 2,265,405.19	$ 1,129,701.12	$ 1,848,284.29	$ 65,846.21	$ 22,386.42	$ 5,331,623.23
Grand Total	**6,155,738**	**$ 35,848,590.48**	**$ 156,773,161.73**	**$ 157,154,272.45**	**$ 349,776,024.66**	**$ 194,087,143.46**	**$ 190,138,654.57**	**$ 11,135,505.59**	**$ 1,545,771.61**	**$ 746,683,099.89**

Attachment II - 2011

Impact Calculation by Drug

Drug	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
DIOVAN	2,656,140	$ 21,245,931.21	$ 80,565,402.46	$ 63,348,940.02	$ 165,160,273.69	$ 88,416,261.71	$ 76,626,281.41	$ 4,405,211.22	$ 1,112,996.38	$ 335,721,024.41
DIOVAN HCT	1,828,419	$ 12,728,874.28	$ 58,551,560.41	$ 57,052,729.34	$ 128,333,164.03	$ 79,750,435.20	$ 57,461,274.75	$ 3,330,420.39	$ 863,121.91	$ 269,738,416.28
EXFORGE	429,943	$ 3,461,143.14	$ 12,805,212.63	$ 14,104,228.95	$ 30,370,584.72	$ 19,513,466.08	$ 13,515,218.24	$ 661,696.23	$ 275,730.58	$ 64,336,695.85
EXFORGE HCT	94,887	$ 764,022.80	$ 2,796,168.55	$ 3,174,629.39	$ 6,734,820.74	$ 4,235,549.00	$ 2,928,653.66	$ 126,943.75	$ 53,983.70	$ 14,079,950.85
LOTREL	67,393	$ 505,285.17	$ 3,079,083.52	$ 2,284,222.68	$ 5,868,591.37	$ 2,932,834.17	$ 1,918,722.93	$ 158,488.37	$ 29,037.71	$ 10,907,674.55
STARLIX	5,331	$ 127,822.13	$ 195,813.49	$ 135,562.70	$ 459,198.32	$ 316,459.24	$ 201,691.47	$ 13,557.82	$ 4,084.01	$ 994,990.86
TEKAMLO	6,956	$ 93,273.68	$ 183,655.97	$ 107,459.60	$ 384,389.25	$ 192,380.88	$ 176,614.30	$ 10,071.55	$ 3,069.98	$ 766,525.96
TEKTURNA	355,272	$ 4,316,432.17	$ 9,670,527.30	$ 7,563,626.06	$ 21,550,585.53	$ 10,283,722.37	$ 9,788,386.71	$ 525,484.80	$ 202,563.84	$ 42,350,743.25
TEKTURNA HCT	71,262	$ 663,010.16	$ 1,890,873.63	$ 1,701,200.74	$ 4,255,084.53	$ 2,327,166.73	$ 2,029,792.68	$ 101,148.91	$ 38,919.84	$ 8,752,112.69
VALTURNA	85,664	$ 662,691.69	$ 1,851,554.00	$ 1,796,050.93	$ 4,310,296.62	$ 2,837,665.02	$ 2,928,665.16	$ 107,485.35	$ 51,341.47	$ 10,235,453.62
Grand Total	**5,601,267**	**$ 44,568,486.43**	**$ 171,589,851.96**	**$ 151,268,650.41**	**$ 367,426,988.80**	**$ 210,805,940.40**	**$ 167,575,301.31**	**$ 9,440,508.39**	**$ 2,634,849.42**	**$ 757,883,588.32**

Attachment II - 2012

Impact Calculation by Drug

Drug	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
DIOVAN	2,513,859	$ 24,945,189.41	$ 88,480,847.61	$ 97,865,634.04	$ 211,291,671.06	$ 90,874,117.25	$ 78,674,849.71	$ 3,370,316.40	$ 4,203,860.13	$ 388,414,814.55
DIOVAN HCT	1,416,928	$ 10,103,101.34	$ 51,773,360.64	$ 71,451,664.71	$ 133,328,126.69	$ 69,010,509.24	$ 46,056,177.10	$ 2,146,785.99	$ 2,049,865.81	$ 252,591,464.83
EXFORGE	418,638	$ 4,017,816.12	$ 14,179,317.74	$ 20,944,322.58	$ 39,141,456.44	$ 20,827,506.36	$ 14,331,392.82	$ 526,450.81	$ 921,095.65	$ 75,747,902.08
EXFORGE HCT	110,539	$ 1,120,795.48	$ 3,753,361.81	$ 5,471,277.83	$ 10,345,435.12	$ 5,488,276.04	$ 3,687,241.80	$ 128,213.96	$ 230,572.46	$ 19,879,739.38
LOTREL	14,241	$ 141,551.62	$ 618,370.32	$ 485,068.19	$ 1,244,990.13	$ 776,276.92	$ 692,233.23	$ 29,329.92	$ 52,901.47	$ 2,795,731.67
STARLIX	5,060	$ 177,025.88	$ 187,433.18	$ 168,164.18	$ 532,623.24	$ 309,954.36	$ 239,482.18	$ 10,151.74	$ 33,314.76	$ 1,125,526.28
TEKAMLO	13,550	$ 88,660.54	$ 340,780.78	$ 363,267.75	$ 792,709.07	$ 424,921.01	$ 440,113.00	$ 22,043.74	$ 25,317.84	$ 1,705,104.66
TEKTURNA	215,325	$ 1,895,531.30	$ 5,457,943.34	$ 6,930,312.77	$ 14,283,787.41	$ 6,070,025.85	$ 7,050,095.45	$ 231,799.41	$ 346,797.99	$ 27,982,506.11
TEKTURNA HCT	45,571	$ 288,822.44	$ 1,130,233.72	$ 1,593,556.76	$ 3,012,612.92	$ 1,471,935.38	$ 1,553,274.04	$ 47,468.25	$ 71,608.57	$ 6,156,899.16
VALTURNA	25,739	$ 38,575.96	$ 557,089.86	$ 721,715.84	$ 1,317,381.66	$ 942,570.02	$ 1,005,490.52	$ 25,102.93	$ 18,472.79	$ 3,309,017.92
Grand Total	**4,779,450**	**$ 42,817,070.09**	**$ 166,478,739.00**	**$ 205,994,984.65**	**$ 415,290,793.74**	**$ 196,196,092.43**	**$ 153,730,349.85**	**$ 6,537,663.15**	**$ 7,953,807.47**	**$ 779,708,706.64**

Attachment II - 2013

Impact Calculation by Drug

Drug	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
DIOVAN	2,447,985	$ 28,648,851.30	$ 86,710,791.89	$ 96,104,736.67	$ 211,464,379.86	$ 134,416,757.65	$ 84,927,668.67	$ 3,704,883.53	$ 11,986,186.19	$ 446,499,875.90
DIOVAN HCT	221,093	$ 1,505,829.63	$ 7,852,766.69	$ 13,370,525.82	$ 22,729,122.14	$ 13,875,837.08	$ 7,213,478.74	$ 375,409.36	$ 741,692.32	$ 44,935,539.64
EXFORGE	407,792	$ 4,602,398.41	$ 13,756,958.19	$ 18,283,183.51	$ 36,642,540.11	$ 29,464,473.90	$ 15,585,473.92	$ 573,205.75	$ 2,589,333.80	$ 84,855,027.48
EXFORGE HCT	120,621	$ 1,404,656.92	$ 4,288,729.81	$ 5,373,094.47	$ 11,066,481.20	$ 8,743,154.92	$ 4,400,204.10	$ 135,221.30	$ 715,510.97	$ 25,060,572.49
LOTREL	11,156	$ 142,531.97	$ 433,486.64	$ 366,068.47	$ 942,087.08	$ 1,001,122.88	$ 639,061.14	$ 27,212.85	$ 144,683.64	$ 2,754,167.59
STARLIX	3,568	$ 143,285.83	$ 130,128.16	$ 110,082.16	$ 383,496.15	$ 242,540.37	$ 181,805.04	$ 8,147.92	$ 64,858.78	$ 880,848.26
TEKAMLO	8,906	$ 79,765.37	$ 197,789.76	$ 232,227.56	$ 509,782.69	$ 508,929.93	$ 355,163.26	$ 11,060.26	$ 40,699.72	$ 1,425,635.86
TEKTURNA	145,119	$ 1,473,785.45	$ 3,331,906.95	$ 4,495,084.36	$ 9,300,776.76	$ 6,825,847.42	$ 5,677,109.98	$ 156,855.25	$ 703,968.42	$ 22,664,557.83
TEKTURNA HCT	32,166	$ 232,558.99	$ 739,550.11	$ 1,060,069.44	$ 2,032,178.54	$ 1,785,082.74	$ 1,313,754.69	$ 29,785.42	$ 159,439.10	$ 5,320,240.49
VALTURNA	26	$ 682.18	$ 845.86	$ 122.30	$ 1,650.34	$ 661.34	$ 282.60	$ -	$ (91.57)	$ 2,502.71
Grand Total	**3,398,432**	**$ 38,234,346.05**	**$ 117,442,954.06**	**$ 139,395,194.76**	**$ 295,072,494.87**	**$ 196,864,408.23**	**$ 120,294,002.14**	**$ 5,021,781.64**	**$ 17,146,281.37**	**$ 634,398,968.25**

Attachment II - 2014

Impact Calculation by Drug

Drug	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
DIOVAN	1,531,128	$ 22,271,839.34	$ 65,195,670.76	$ 63,812,102.41	$ 151,279,612.51	$ 107,975,700.03	$ 52,500,028.30	$ 2,651,877.77	$ 14,277,897.82	$ 328,685,116.43
DIOVAN HCT	35,481	$ 664,582.87	$ 1,409,688.96	$ 970,621.96	$ 3,044,893.79	$ 2,831,856.42	$ 1,937,209.64	$ 107,559.23	$ 802,189.76	$ 8,723,708.84
EXFORGE	313,221	$ 4,682,513.35	$ 11,789,437.74	$ 13,378,034.63	$ 29,849,985.72	$ 29,910,063.50	$ 12,490,562.17	$ 484,222.66	$ 5,430,713.78	$ 78,165,547.83
EXFORGE HCT	103,430	$ 1,731,209.59	$ 4,240,366.14	$ 4,311,027.04	$ 10,282,602.77	$ 9,523,493.88	$ 4,012,898.73	$ 132,363.42	$ 1,696,852.05	$ 25,648,210.85
LOTREL	8,903	$ 192,321.73	$ 355,402.81	$ 268,433.58	$ 816,158.12	$ 907,255.51	$ 540,764.76	$ 24,628.82	$ 265,941.59	$ 2,554,748.80
STARLIX	2,624	$ 143,267.56	$ 97,462.84	$ 69,319.30	$ 310,049.70	$ 201,980.02	$ 141,865.58	$ 6,951.48	$ 82,909.90	$ 743,756.68
TEKAMLO	6,842	$ 89,389.51	$ 162,751.84	$ 166,284.96	$ 418,426.31	$ 443,439.05	$ 295,312.44	$ 9,467.34	$ 74,162.60	$ 1,240,807.74
TEKTURNA	95,726	$ 1,312,331.69	$ 2,343,848.40	$ 2,568,255.87	$ 6,224,435.96	$ 4,994,986.14	$ 4,396,179.11	$ 123,661.23	$ 995,907.65	$ 16,735,170.09
TEKTURNA HCT	21,597	$ 219,151.73	$ 519,867.81	$ 569,467.81	$ 1,308,487.35	$ 1,385,828.32	$ 1,036,496.64	$ 26,499.54	$ 269,925.71	$ 4,027,237.56
Grand Total	**2,118,952**	**$ 31,306,607.37**	**$ 86,114,497.30**	**$ 86,113,547.56**	**$ 203,534,652.23**	**$ 158,174,602.87**	**$ 77,351,317.37**	**$ 3,567,231.49**	**$ 23,896,500.86**	**$ 466,524,304.82**

Attachment II - 2015

Impact Calculation by Drug

Drug	PDE Count	Reinsurance	LICS	Risk Sharing	Government Impact	Plan Impact	Beneficiary Impact	Other TrOOP	PLRO	Total Impact
DIOVAN	239,492	$ 4,549,718.18	$ 17,254,705.97	$ 13,781,629.02	$ 35,586,053.17	$ 12,670,276.04	$ 7,606,658.44	$ 692,490.36	$ 1,955,355.34	$ 58,510,833.35
DIOVAN HCT	22,899	$ 684,180.99	$ 1,075,666.21	$ 1,081,122.35	$ 2,840,969.55	$ 2,008,857.13	$ 1,277,624.50	$ 78,752.69	$ 719,676.99	$ 6,925,880.86
EXFORGE	60,236	$ 858,805.52	$ 2,217,714.60	$ 5,075,674.94	$ 8,152,195.06	$ 5,172,003.79	$ 2,022,795.32	$ 79,233.70	$ 1,260,930.68	$ 16,687,158.55
EXFORGE HCT	11,677	$ 63,606.50	$ 448,610.18	$ 975,025.25	$ 1,487,241.93	$ 900,499.48	$ 326,548.87	$ 9,655.90	$ 143,591.78	$ 2,867,537.96
LOTREL	7,305	$ 207,276.33	$ 312,562.46	$ 324,963.17	$ 844,801.96	$ 794,347.70	$ 478,554.13	$ 24,120.03	$ 267,867.74	$ 2,409,691.56
STARLIX	2,040	$ 103,916.08	$ 96,528.94	$ 85,211.17	$ 285,656.19	$ 149,469.75	$ 105,578.78	$ 6,144.36	$ 60,516.42	$ 607,365.50
TEKAMLO	2,560	$ 8,755.60	$ 50,433.02	$ 120,801.36	$ 179,989.98	$ 203,220.58	$ 127,854.04	$ 2,899.32	$ 44,098.32	$ 558,062.24
TEKTURNA	72,621	$ 1,251,240.90	$ 1,794,998.63	$ 3,084,976.44	$ 6,131,215.97	$ 4,795,046.85	$ 3,754,234.10	$ 96,981.70	$ 1,033,301.17	$ 15,810,779.79
TEKTURNA HCT	16,196	$ 196,006.73	$ 393,459.32	$ 752,938.95	$ 1,342,405.00	$ 1,236,906.00	$ 878,757.87	$ 18,337.06	$ 277,088.75	$ 3,753,494.68
Grand Total	**435,026**	**$ 7,923,506.83**	**$ 23,644,679.33**	**$ 25,282,342.65**	**$ 56,850,528.81**	**$ 27,930,627.32**	**$ 16,578,606.05**	**$ 1,008,615.12**	**$ 5,762,427.19**	**$ 108,130,804.49**

Appendix I. Medicaid Fee for Service Prescription Payments by State

Figure 1: Damages for Medicaid Fee for Service by State, 2004-2011

State	Prescriptions		Damages
CA	29,224	$	1,662,500
CO	-	$	-
CT	15,874	$	450,232
DE	-	$	-
FL	1,533	$	59,778
GA	6,707	$	217,823
HI	-	$	-
IA	-	$	-
IL	118,055	$	4,510,885
IN	2,098	$	73,321
LA	19	$	451
MD	11,382	$	543,730
MA	162	$	3,915
MI	11,168	$	361,014
MN	-	$	-
MT	-	$	-
NV	-	$	-
NH	-	$	-
NJ	79,700	$	1,748,459
NM	-	$	-
NY	791	$	28,245
NC	-	$	-
OK	-	$	-
RI	-	$	-
TN	80,113	$	2,126,506
TX	10	$	318
VA	-	$	-
WA	2,686	$	24,908
WI	19,004	$	597,027
DC	-	$	-
Total	**378,526**	**$**	**12,409,115**

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent refills from Medicaid data. Amount Paid is reported in the Medicaid data under the field, "amount paid." Payments to state governments are apportioned using the annual Federal Medical Assistance Percentages. The portion allocated to state governments includes only the states included in the relator's Third Amended Complaint. For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted.

Figure 2: Damages for Medicaid Fee for Service by State, 2004-2011: Alternative Scenario

State	Prescriptions		Damages
CA	12,105	$	704,888
CO	-	$	-
CT	7,187	$	197,473
DE	-	$	-
FL	885	$	35,742
GA	2,148	$	72,886
HI	-	$	-
IA	-	$	-
IL	49,821	$	1,957,755
IN	436	$	15,570
LA	19	$	451
MD	4,427	$	212,802
MA	86	$	1,330
MI	4,344	$	143,517
MN	-	$	-
MT	-	$	-
NV	-	$	-
NH	-	$	-
NJ	41,772	$	915,162
NM	-	$	-
NY	468	$	17,092
NC	-	$	-
OK	-	$	-
RI	-	$	-
TN	28,048	$	773,064
TX	6	$	183
VA	-	$	-
WA	750	$	6,905
WI	6,146	$	194,190
DC	-	$	-
Total	**158,648**	**$**	**5,249,010**

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent refills from Medicaid data. Amount Paid is reported in the Medicaid data under the field, "amount paid." Payments to state governments are apportioned using the annual Federal Medical Assistance Percentages. The portion allocated to state governments includes only the states included in the Relator's Third Amended Complaint. For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted. In this alternative scenario, kickbacks associated with an event associated only with Diovan, Exforge, or Tektruna (but not the HCT versions of those drugs) before 2010 are excluded for purposes of calculating damages.

Appendix J. Medicaid Managed Care Prescription Payments by State

Figure 1: Damages for Medicaid Managed Care by State, 2004-2011

State	Prescriptions		Damages
CA	49,283	$	2,485,534
CO	-	$	-
CT	433	$	16,292
DE	-	$	-
FL	11	$	5,635
GA	539	$	16,921
HI	-	$	-
IA	-	$	-
IL	-	$	-
IN	428	$	13,360
LA	-	$	-
MD	9,026	$	347,251
MA	-	$	-
MI	8,272	$	268,796
MN	-	$	-
MT	-	$	-
NV	-	$	-
NH	-	$	-
NJ	10,573	$	485,709
NM	220	$	3,625
NY	226,642	$	9,625,841
NC	-	$	-
OK	-	$	-
RI	-	$	-
TN	-	$	-
TX	-	$	-
VA	-	$	-
WA	1	$	39
WI	-	$	-
DC	-	$	-
Total	**305,428**	**$**	**13,269,002**

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent refills from Medicaid data. Amount Paid is reported in the Medicaid data under the field, "amount paid." Payments to state governments are apportioned using the annual Federal Medical Assistance Percentages. The portion allocated to state governments includes only the states on the relator's Third Amended Complaint. For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted.

Figure 2: Damages for Medicaid Managed Care by State, 2004-2011: Alternative But For Scenario

State	Prescriptions		Damages
CA	28,011	$	1,435,097
CO	-	$	-
CT	187	$	7,082
DE	-	$	-
FL	7	$	3,254
GA	228	$	7,164
HI	-	$	-
IA	-	$	-
IL	-	$	-
IN	59	$	1,693
LA	-	$	-
MD	5,001	$	194,040
MA	-	$	-
MI	3,531	$	113,996
MN	-	$	-
MT	-	$	-
NV	-	$	-
NH	-	$	-
NJ	5,920	$	285,242
NM	43	$	23
NY	110,945	$	4,704,725
NC	-	$	-
OK	-	$	-
RI	-	$	-
TN	-	$	-
TX	-	$	-
VA	-	$	-
WA	-	$	-
WI	-	$	-
DC	-	$	-
Total	**153,932**	**$**	**6,752,313**

Notes: Number of Rx includes new prescriptions associated with kickbacks and their subsequent refills from Medicaid data. Amount Paid is reported in the Medicaid data under the field, "amount paid." Payments to state governments are apportioned using the annual Federal Medical Assistance Percentages. The portion allocated to state governments includes only the states on the relator's Third Amended Complaint. For Diovan, Exforge, and Tekturna, prescriptions and payments prior to January 2010 (exclusive) are omitted. For Lotrel, prescriptions and payments after May 2007 (inclusive) are omitted. In this alternative scenario, kickbacks associated with an event associated only with Diovan, Exforge, or Tektruna (but not the HCT versions of those drugs) before 2010 are excluded for purposes of calculating damages.